

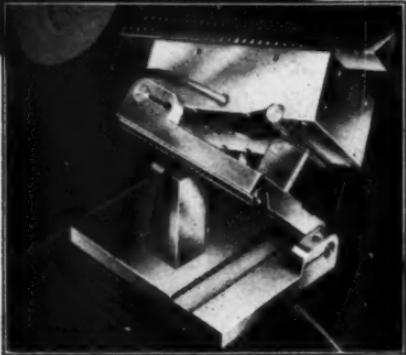
# HITCHCOCK'S Machine Tool BLUE BOOK

FOUNDED

JANUARY 1940

1905

How Much  
You Like To  
HAVE 55 MINUTES  
OF ONE HOUR?



## BY THE MAGNA-SINE METHOD

.... to position the work at the exact angle and to hold it securely in place requires *only* the Magna-Sine and gage blocks. The entire set-up can be completed IN APPROXIMATELY FIVE MINUTES. After grinding, a positive check for accuracy can be made by simply checking the gage blocks used. With the Magna-Sine, every angular grinding job is accurate to the gage block limits.

If you do an average volume of angular grinding work, there's a place on your grinders for the time-saving, money-saving Magna-Sine. Let us send you full details.

Once it took an hour, but now the Colonial Broach Company complete this angular grinding set-up in five minutes! It's a typical example of savings that are effected by the use of the Magna-Sine . . . savings that have been realized consistently by Colonial Broach during the four years that they have been Magna-Sine users.



## BY THE OLD METHOD

.... a set-up to grind this broach required a V-block, angle plate, two sine bars, two clamps, a strap and gage blocks. Such a set-up could not be made in much less than one hour. Initial accuracy could not be guaranteed, and there was no assurance that the various parts of the set-up would not slip or otherwise change position during grinding. It was essential that the finished job be checked carefully, often necessitating an additional set-up for this purpose.

# The MAGNA-SINE

ROBBINS ENGINEERING  
639 Mt. Elliott Ave. • Detroit, M

# MARVEL SAWS

... a complete line

## A Complete System of Metal Sawing

When in Cleveland for the Machine Tool Show, be sure to visit the MARVEL exhibit in the Central Armory just across the street from the Cleveland Public Auditorium. See:

The full MARVEL Line of Hack Sawing Machines, Fully Automatic Production Saws, and Metal Cutting Band Sawing Machines, in operating demonstrations.

The non-breakable MARVEL High-Speed-Edge Hack Saw Blades and Hole Saws demonstrated under actual working conditions.

Bring your metal-cutting problems with you. A large corps of MARVEL metal-cutting engineers will be in constant attendance to discuss all metal-cutting problems and recommend proper methods and equipment for your work. As pioneers in the building of fully automatic production hack sawing machines; in the invention and development of the only genuine high speed steel hack saw blade that is positively non-breakable; in the design and building of "giant" hydraulic hack saws for the cutting of tough alloy steels in large billet sizes; and still the only manufacturer who offers full ball-bearing designs, you can assume complete confidence in our metal sawing recommendations.

MARVEL will have the most complete and the most comprehensive metal saw exhibition at Cleveland. Be sure to see it for the last word in modern metal saw developments.

*Buy from your local distributor.*

ARMSTRONG-BLUM MFG. CO.,  
"The Hack Saw People"  
CHICAGO U. S. A.



"TAKES TIME  
HEAT."

# Remote Control

• An exclusive Hobart feature, Remote Control, gives the operator 10 fine adjustments of welding heat at his finger tips, making it easy to get the exact welding heat for various positions without leaving his work. speeds up production, insures better quality welds, cuts labor costs . . . and helps make you more profit! Another Hobart advantage, Multi

Range Dual Control, gives the operator a choice of 1,000 welding combinations . . . making high-quality welds easy to produce.

**30 DAYS TRIAL.** We want to prove all we've said about Hobart Simplified Arc Welders to your own satisfaction. Write today for details of our liberal trial plan that lets you use a new Hobart Welder on your own work for 30 days . . . at our risk!

**HOBART BROS. CO., Box TB-140, TROY, OHIO**  
"One of the World's Largest Builders of Arc Welders"

**HOBART BROS. CO., Box TB-140, TROY, OHIO**

Without obligation, send me full information about the new Hobart coloring Arc Welder, particularly on the items checked below:

Electric Drive       Gas Drive       "Build Your Own"

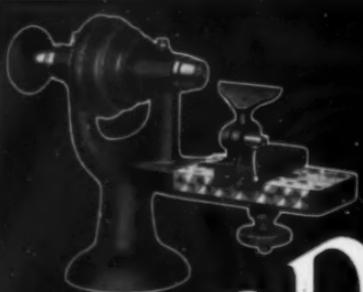
I'm interested in \_\_\_\_\_ Amp. capacity.

Also information on  30 Days Trial  Easy-to-Owe Terms

Renting a new welder with purchase privilege

NAME \_\_\_\_\_

ADDRESS \_\_\_\_\_



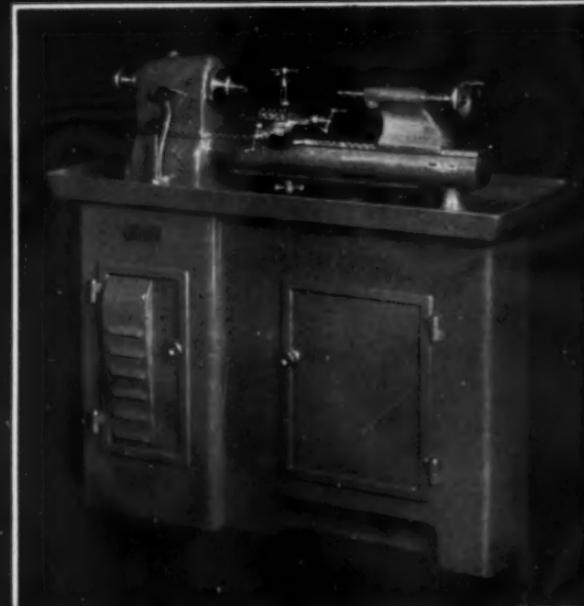
1890

1940

HARDINGE

GOLDEN ANNIVERSARY

PRECISION SINCE 1890



**F**IIFTY years of Precision . . . from the filing or polishing head, through watchmakers' precision tools and lathes to the modern, favorably known Hardinge High Speed Precision Cataract Machines.

Fifty years of Precision . . . from cone to enclosed head style bench lathes in various sizes and finally as the originators of the Enclosed Head Preloaded Ball Bearing Lathe.

Today it is the HARDINGE Enclosed Head Preloaded Ball Bearing Lathe with pedestal, combining experience gained in our fifty years of precision manufacturing.

Hardinge machine mountings have also kept pace with machine improvements and refinements. First came the bench, then the cabinet and now the new welded steel pedestal type, as illustrated, providing ample room for attachments and collets.

Watch future issues for our golden anniversary messages regarding the modern HARDINGE High Speed Precision Milling Machines, High Speed Precision Tool Room Screw Cutting Lathes and High Speed Precision Second Operation Machines. These messages will be of interest and value to you.

*Ask for our latest bulletins presenting complete information on HARDINGE Precision Machines.*

## **HARDINGE BROTHERS, INC.**

**ELMIRA, - - - - - N. Y.**

**CHICAGO - NEW YORK - HARTFORD**  
**DETROIT - CLEVELAND - PHILADELPHIA**

# Rock River Production Machines for working steel plates, bars and structural shapes

**Single end Vertical Punches and Shears**  
**Double end Vertical Punches and Shears**  
**Single end Horizontal Punches and Shears**  
**Bending and Straightening Machines**  
**Vertical and Horizontal Bulldozers**  
**Hand Power Punches and Shears**  
**Combination Punches and Shears**  
**Alligator Shears**  
**Splitting Shears**  
**Bar and Billet Shearing Machines**  
**Pyramid Plate Bending Rolls**  
**Pinch Type Plate Bending Rolls**  
**Culvert Pipe Equipment**  
**Stake Riveters**

Descriptive bulletins sent upon request. Hannifin engineers will make specific recommendations to meet individual requirements.

**ROCK RIVER MACHINE DIVISION**  
**HANNIFIN MANUFACTURING COMPANY**  
412 NORTH MAIN STREET • JANEVILLE, WISCONSIN



Type S Plate Bending Roll, available in a full range of sizes.

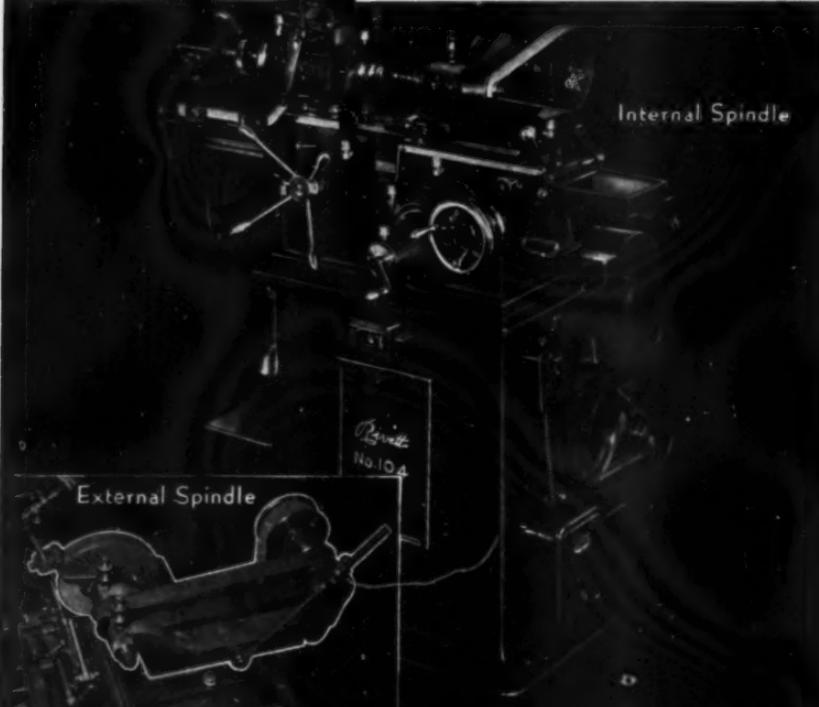
# MORE PRECISION WORK

## On Rivett 104

With interchangeable spindles for internal and external grinding you are always ready for **MORE PRECISION WORK** whether it be in the toolroom or on small lot production. The ease of set-up, wide range of adjustment and high spindle speeds have built the fame of "104" as a "work-getter" throughout this country and abroad.

*Write for Bulletin 104C*

**RIVETT LATHE & GRINDER INC.**  
Brighton, Boston, Mass.



# RIVETT



## MUCH STRENGTH IN LITTLE SPACE

When space limitations are severe but strength requirements rigid, designers are faced with a major problem. The use of Molybdenum steels has solved many such problems.

A manufacturer of industrial haulage trucks, for example, was up against that very situation. The drive shafts of this equipment must stand considerable abuse. Quick acceleration and sudden stops are the rule rather than the exception. And space is at a premium.

This manufacturer found in Nickel-Chrome-Molybdenum steel exactly the

qualities required — high strength, which permits relatively small section, plus an exceptional combination of toughness, ductility and fatigue strength. The machineability of this steel in the heat treated condition keeps fabrication costs down.

It will pay you to re-check your material specifications in the light of present knowledge of the qualities and characteristics of Molybdenum steels. Our helpful book, "Molybdenum in Steel", is sent free to interested production executives and engineers on request.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

Climax Molybdenum Company  
500 Fifth Avenue New York City

# MORE Hanna Cylinders ON THEIR WAY TO PUSH PULL RAISE LOWER

CAN YOU USE ONE?



Available in all sizes and several models. Low first cost and ease of application encourages the use of Hanna Cylinders for all manner of operations.

**HANNA**  
Engineering Works  
1763 Elston Avenue  
CHICAGO ILLINOIS



## TOGGLE DRIVEN BEAM PUNCHES

### FOR PUNCHING EXTRA LARGE STRUCTURAL SHAPES AND MANUFACTURED PARTS

Giving you the many advantages of toggle drive—delivering maximum punching force at the point in the stroke where it is most required—imposing a more uniform torque on the motor—permitting a smaller flywheel—reducing power consumption, cutting maintenance costs and saving floor space—as contrasted with units with drives of the eccentric type.

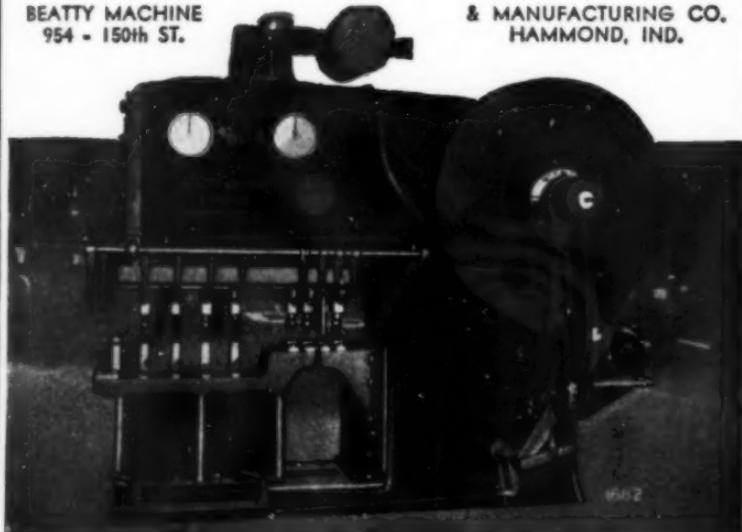
See how these BEATTY specifications compare with your requirements:

	No. 13	No. 14	No. 15
Face of slide, r to l, St'd.	12 $\frac{1}{2}$ "	12 $\frac{1}{2}$ "	13"
" " " Maximum	24	24	34
" " " front to back	48	40	40
Die space	42	48 $\frac{1}{2}$	48 $\frac{1}{2}$
Stroke	2	2 $\frac{1}{2}$	3
Throat	25	28 $\frac{1}{2}$	34
Face of table, front to back	46	60	64
" " " r to l, St'd.	22	22	28
" " " Maximum	30	34	38
Capacity	200T	300T	400T
Shipping weight, lbs.	42,000	57,000	76,000
Motor required, H.P.	7 $\frac{1}{2}$	10	15
Spacing table to suit requirements	2 holes thru 1 $\frac{1}{2}$ "	4 holes thru 1 $\frac{1}{2}$ "	4 holes thru 1 $\frac{1}{2}$ "
Punching capacity			

Send for Folder 1500-A giving full information.

BEATTY MACHINE  
954 - 150th ST.

& MANUFACTURING CO.  
HAMMOND, IND.



JANUARY 1940

MACHINE TOOL BLUE BOOK

Page 9



Every one of these operations—so slow and costly when done by hand—is made fast and profitable by the use of SKILSAW TOOLS in the plant of Ex-Cell-O Corporation at Detroit, well-known as one of America's finest manufacturers of precision machinery.

In every industry, SKILSAW TOOLS are used to

step-up production, reduce costs and improve workmanship. They are preferred because they're designed and built to the most exacting precision standards . . . to give long years of dependable, trouble-free operation. Ask for a FREE demonstration on your own work. Sold by leading mill supply distributors.

**SKILSAW, INC.**

5035 Elston Avenue, Chicago, Ill.

30 East 22nd St., New York—152 Main St., Buffalo—32 Brookline Ave., Boston—15 B. 23 St., Philadelphia—2124 Main St., Dallas—918 Union Street, New Orleans—1238 South Flower St., Los Angeles—3020 Webster Street, Oakland—2020 Peachtree St., Atlanta—1112 Olive Way, Seattle  
Canadian Branch: 88 Dufferin Ave., Toronto.



# Motor-Avey

## Drilling AND Tapping Machines

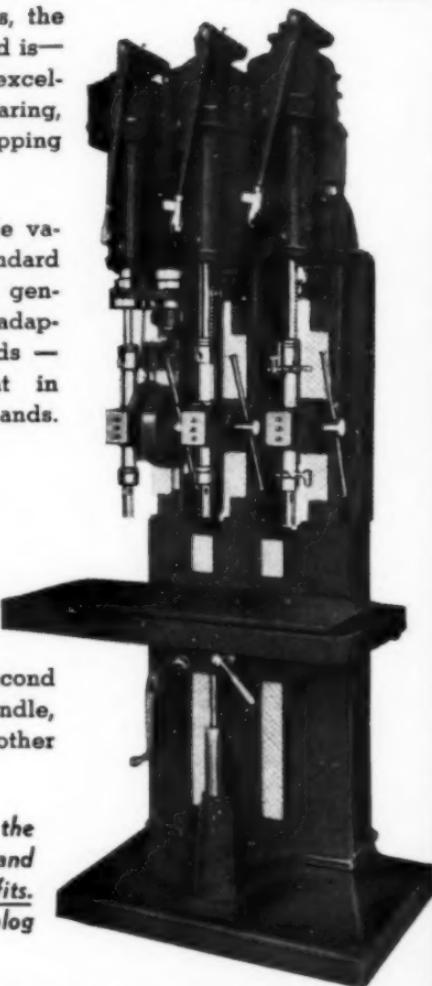
For more than three decades, the name "AVEY" has been—and is—regarded as the standard of excellence in the making of ball bearing, sensitive drilling and tapping equipment.

Avey products include a wide variety of types and sizes in standard single and multiple spindle, general purpose machines—also adaptations to specialized needs—meeting every requirement in today's high production demands.

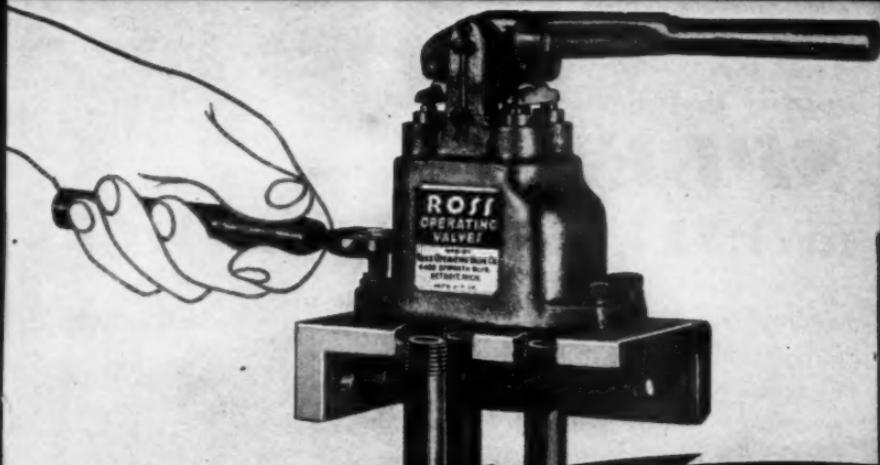
### TYPE MA-6 Six Speeds

The unit shown is the six-speed No. 2 Combination Machine Type MA-6. First spindle is Avey-matic; second spindle, hand feed; third spindle, tapping. Can be supplied in other combinations as required.

Let AVEY Equipment show you the way to new economies in drilling and tapping—new production profits. Send TODAY for AVEY Catalog No. 39.



**The AVEY DRILLING MACHINE CO., Cincinnati, O.**



# JUST 3 MINUTES

that's all the time it took  
me to change valves. . . .

\*  
A SIZE AND TYPE  
FOR EVERY OPERATION

\*

**ROSS**  
Air Control  
**VALVES**



Ross Valves permit speedy removal — only four bolts to turn and the job is done. All piping is installed permanently to bracket and need never be disturbed. Shut-down periods are thereby shortened and valuable time saved. It's another feature recommended and originated by Ross

Send for Catalog

**ROSS Operating VALVE CO.**  
6480 Epworth Boulevard  
DETROIT, MICHIGAN

MEET MODERN COMPETITION

comes now . . .

# SPEED of control in HYDRAULIC OPERATIONS

Speed of reaction without sacrificing efficiency is now being had by pneumatically controlling hydraulic power valves. There is an important saving in reaction time of pneumatic controls over the comparatively slower hydraulic reaction in identical circuits.

T-J Pneumatic Remote Controls provide full advantage of this saving also in that their variety of unit types permit their application to your requirements to be of standardized equipment.

Bulletin number RC-4 reports on the high points of these systems in this application type as well as in many others in which they are being successfully and increasingly used. Your copy will be sent promptly upon receipt of your request.



T-J Controls are shown here on a T-J Hydraulic Rivitor. Developed for riveting aircraft fuselage and wing sections, the operator's station is necessarily some distance from the power valve. T-J Pneumatic Controls provide the desired snappy reaction to the power valve.

**this is a TOMKINS-JOHNSON product**

Factory at 605 N. Mechanic St.,

Jackson, Michigan

Agents in principal cities. T-J Products also include Air and Hydraulic Cylinders . . . Rotating Chucks and Cylinders . . . Rivitors . . . Clinchers . . . Special Equipment . . . Brownie Coolant Pumps . . . T-J Die Sinking Milling Cutters.

# MEET MODERN COMPETITION

With Chicago Steel Brake  
Production Performance



BOX  
AND PAN  
BRAKE—

Forms boxes or pans from one piece of metal. A straight brake as well as a box brake. Ideal for experimental shops.



HAND BRAKE—

Improved to meet modern needs. Efficient and dependable — sturdy and durable.



POWER BENDING BRAKE—

Indispensable wherever a volume of heavy plate work is done—forms a great variety of beads and shapes without dies.



FORMING  
PRESS DIES

We manufacture any type of die required for forming operations. Our die department will quote on any type to meet your needs. Submit the print or sample of work.

## 36 Years' Experience..

building STEEL CONSTRUCTED sheet metal working machines are behind each CHICAGO BRAKE. They're built to give years of service.

ALL CHICAGO BRAKES are built of rolled steel welded sections which insure great strength, accuracy and long life. They are the most modern tools in design and workmanship to fit today's need for fast production sheet metal working machinery.

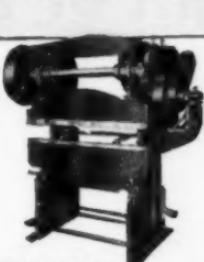
We Are The World's Largest Manufacturers Of Hand Bending, Power Bending And Power Press Brakes.

Aside from the CHICAGO line, we have built many special machines for intricate bending operations. Take advantage of our many years' experience by sending us any difficult bending problem you have.

**DREIS & KRUMP MFG. CO.**

7440 LOOMIS BLVD.,

CHICAGO, ILL.



SMALL PRESS BRAKE—

Compact, powerful money-saving production unit. Replaces cumbersome costly machines that are expensive to operate. Uses same dies as larger machines.



LARGE PRESS BRAKE—

The only press brake which turns out perfect work without shims and crowned dies. Patented non-deflecting bed equalizes pressure over the full bending length and overcomes major fault in solid bed press brakes.

OVER 40,000

"CHICAGO" BRAKES in use by leading concerns—the world over

# MACHINE TOOL DRIVES

ANY  
MACHINE  
ANY TYPE  
ANY SIZE



## Buy with Confidence and the Thought of Tomorrow

Berkeley Machine Tool Drives have those exclusive features not disclosed in their price, but remembered during the years of economical service they give.

Welded steel supporting brackets with aligning screws.

Rigidity of countershaft support that permits no distortion or mis-alignment.

Simple, quick adjustments for all belts which will insure long uninterrupted periods of service.

A competent organization is ready to serve you.

**The BERKELEY ENGINEERING Co.**

1381 E. 17 th St.,  
CLEVELAND, OHIO

CORRY,  
PENNSYLVANIA

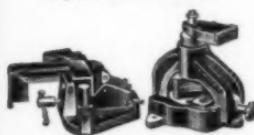
# WHITNEY TOOLS

MADE BY SPECIALISTS TO MEET EVERY  
NEED OF PRACTICAL SHEET METAL MEN



**No. 4 Angle Iron Shear**

Capacity  $2'' \times 2'' \times \frac{1}{4}''$  angle iron or smaller.



**Angle Mitre Notcher and Angle Iron Bender**

Capacity  $2'' \times 2'' \times \frac{1}{4}''$  angle iron or smaller. A pair of tools that every shop ought to have. They are Nos. 50 and 51 in our catalog.



**No. 10 Ball Bearing Punch**

Capacity  $\frac{1}{8}$  inch through  $\frac{1}{4}$  inch iron. Depth of throat  $1\frac{1}{2}$  inch. Height of throat  $\frac{3}{8}$  inch. Furnished with one punch in any size from  $\frac{1}{8}$  to  $\frac{1}{2}$  by 1-32.

Whitney manufactures more than 80 types of Shears, Punches and other tool equipment for metal working — dependable items perfected through long experience and close contact with the trade — tools that have "always made good."



**Imperial Roller Bearing Punches**

—offered in 3 sizes—will work inside 90 degrees. Quick changing for punches and dies—no cams to wear—stripping action is positive.



**Aircraft Rivet Squeezer**

Capacity  $\frac{1}{8}$  inch aluminum rivet. Spindle travel  $13/16$  inch. Made in 5 sizes, with throat depths from  $1\frac{1}{4}$  to 6 inches.

*Send for the complete Whitney catalog.*



**WHITNEY METAL TOOL COMPANY**  
115 FORBES ST., ROCKFORD, ILLINOIS



**No. 20 Ball Bearing Punch**

Capacity  $\frac{1}{8}$  thru  $\frac{1}{2}$  iron.





**\$291.00**

No. 1545 — Complete  
with production type  
table and stand, motor  
pulleys and belts—but  
without motors.

**DELTA**  
MANUFACTURING CO.  
(INDUSTRIAL DIVISION)  
603 E. VIENNA AVENUE  
MILWAUKEE, WIS.

*"These drill presses  
pulled me  
out of a jam!"*



"Because they not only enabled me to speed up production with a small new tool investment—but I was given quick delivery on them. Yes, I got them—without the old man raising the roof on their cost."

That is what scores of production superintendents are telling us about Delta Drill Presses. They come with single or multiple spindle, floor or bench types, 11", 14" and 17" models. They give you durable precision machines at a fraction of the cost of the old type heavy machines. They are flexible—adaptable to special jobs and quick changes. They can be used for special set ups at great savings. The two-spindle 17" model here illustrated gives an

### **Outstanding Drill Press Value**

Drilling capacity:  $\frac{3}{4}$ " in cast iron. Table  $29\frac{1}{2}'' \times 41\frac{1}{2}''$ , surface  $23\frac{1}{2}'' \times 36''$ ;  $48\frac{1}{2}''$  high. Center to center between spindles 18". Column diameter  $3\frac{1}{2}''$ . Maximum distance chuck to table, 26". Table has  $1\frac{1}{2}''$  oil trough, drilled and tapped at rear for  $\frac{1}{2}''$  oil drain pipe. Quill has 5" stroke. Built-in depth stop gauge. Depth gauge on spring housing. Sealed for life ball bearings. Interchangeable spindles and heads. Shipping weight 860 lbs.

#### **Send for Delta Catalog**

Mail coupon for latest Delta Industrial Power Tool Catalog. It contains specifications and prices of complete line of Delta Drill Presses plus details on individual parts from which you can make your own low cost assemblies.



Delta Mfg. Co., (Industrial Division)  
603 E. Vienna Ave., Milwaukee, Wis.

Gentlemen: Please send me your latest Delta Catalog which contains specifications and prices of your complete line of Drill Presses.

Name \_\_\_\_\_  
Address \_\_\_\_\_  
City \_\_\_\_\_ State \_\_\_\_\_



**This man  
cleans welds**



**But they**

**This man builds  
machine tools**



**This man finishes  
forging dies . . .**



**This man finishes  
parts at the bench . . .**

# all use KELLERFLEX!

**T**HERE is no limit to the number of places Kellerflex equipment can be applied successfully. Shop men welcome the chance to substitute this compact machine for hand drudgery. It is excellent economy, because it saves skilled hands for the work that machines cannot do.

Pratt & Whitney is Headquarters for the finest of flexible shaft equipment. Pratt & Whitney precision goes into every part. This quality

insures smooth, accurate operation and long life, even under the most difficult working conditions.

There are many styles and sizes of Kellerflex machines. Each has a complete line of accessories and attachments which make it applicable to almost any finishing job. Let our Kellerflex experts show you the many ways these handy machines can save time and pay dividends. Write for complete information.

## PRATT & WHITNEY

Division Niles-Bement-Pond Co.

Hartford, Connecticut

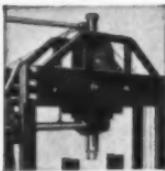
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Kellerflex Sales Department

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# KRW HYDRAULIC ARBOR PRESSES

## HAVE SPEED AND POWER FOR INDUSTRIAL USE



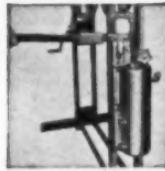
Rack teeth cut directly into ram—no separate rack bar.



Heavily constructed enclosed draw and ratchet raises and lowers bed.



Extensible cross-arms for greater leverage have locating grooves for extended and central positions.



Oil reservoir tank has convenient filling plug and shut-off valves.



V blocks furnished have machined shoulders for accurate alignment on bed.



Machined shoulders align V blocks when in inverted position and prevent slippage.

Built with the speed and strength necessary for industrial use, KRW Presses perform such operations as broaching, assembling, straightening, bending, offsetting, squeezing, pressing, and flattening. Small blanking operations can be performed when the blanking dies are built into a die set provided with guide pins.

Strictly a one-man press, special KRW features minimize operator fatigue. Trussed design of bed and crown members results in extreme rigidity and accuracy.

*Write for new bulletin describing this cost-cutting equipment.*

### PRICES F. O. B. FACTORY, ARCADE, N. Y.

No. 37—35 ton Hydraulic and Sensitive Arbor Press .....	\$150.00
No. 37E—50 ton Hydraulic and Sensitive Arbor Press .....	180.00
No. 37F—75 ton Hydraulic and Sensitive Arbor Press .....	300.00

Gauge and fittings, \$20.00 extra on all presses.

### K. R. WILSON

10-16 Lock Street, Buffalo,

Export Department

90 West St., New York, N. Y.

N. Y., U.S.A.

West Coast Branch

722 Mateo St., Los Angeles

*Ettco* - *Emrick*

## TAPPING ATTACHMENTS

THE EXACTING REQUIREMENTS OF TAPPING IS UP TO THE FRICTION CLUTCH

ETTCO PIONEERED SENSITIVE TAPPING WITH A LEATHER LINED FRICTION CLUTCH. AS YET WE HAVE FOUND NO SUBSTITUTE TO EQUAL ITS SMOOTH, SENSITIVE ACTION. IT SAVES TAPS, LASTS LONGER AND INSURES ACCURATE HOLES.

SEVEN SIZES  
FROM THE  
FINEST TO  
1" TAPS



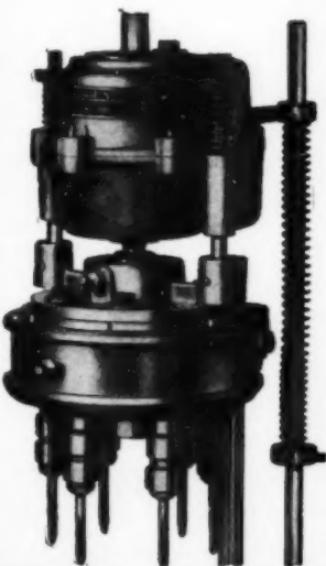
## MULTIPLE SPINDLE TAPPING HEADS DRILL HEADS

"A STANDARDIZED SYSTEM"

ETTCO HEADS ARE A MANUFACTURED PRODUCT ASSEMBLED TO FIT YOUR NEEDS.

SERVICE IS FROM STOCK PARTS, THE COST IS LOW AND YOUR JOB IS FROM 100 TO 500% FASTER.

LET US HAVE A PRINT OR SAMPLES OF YOUR SMALL PARTS—WE WILL BE PLEASED TO SEND A STANDARDIZED QUOTATION.



## ETTCO TOOL CO.

594 JOHNSON AVE.,  
CHICAGO

BROOKLYN, N. Y.  
DETROIT

## A Glimpse INTO OUR SERVICE



# COAST

from

These pictures show  
very vividly the four  
different services at  
your command. These  
services include:—

### TOOL SALVAGE—

Recutting drills,  
reamers, end mills,  
cutters and files.

### HARD CHROME PLATING—

Rebuilding pneumatic  
tools and parts to  
standard size.

### HARD CHROME PLATING—

Machine parts and  
dies plated for longer  
service.

### PNEUMATIC TOOLS—

Master chipping hammers,  
parts and accessories.

**MASTER TOOL CO., INC.**  
Cleveland, Ohio

**THE MASTER  
CHROME SERVICE, INC.**  
Cleveland, Ohio

# COAST

From the rocky coast of Maine, to the sunny shores of California, this unique service is at your fingertips. In 30 of the largest cities, representatives are located who will take care of your orders. Send for our catalogs giving detailed description of these distinct services and listing the representative nearest you. Call a representative in and have him give you an estimate.



**THE ONLY COMPLETE  
TOOL SALVAGE SERVICE**

**EASTERN CUTTER  
SALVAGE CORP.**  
Newark, New Jersey

## MAX-WELL-MADE PRECISION TOOLS



**MASTUR**  
Precision  
Boring  
HEAD  
3  
Sizes

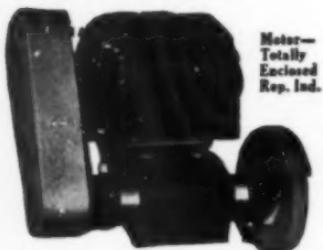
Direct reading in  
thousandths.  
Vernier reading  
two tenths.  
Boring Cap. 7° to 15°.



**E-Z SET**  
Boring Tool  
3  
Sizes

Adjustment  
actuated by worm.  
Can be used as Radius Tool.

### TYPE HE 1/2 H. P.



**Motor—**  
Totally  
Enclosed  
Rep. Ind.

Internal or External. Internal Spindles up to 24" long.

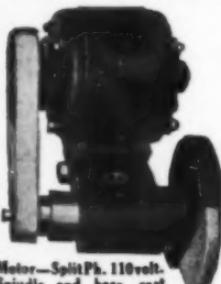
### TYPE E 1/2 H. P.



**Motor—**  
Ventilated  
Rep. Ind.

Spindle and Base Cast Solid.

### TYPE N 1/4 and C 1/3 H. P.



**Motor—** Split Ph. 110 volt.  
Spindle and base cast  
solid. A general Utility  
Grinder.

### TYPE U-1-2-3-5 H. P.



**Motor—** Totally  
enclosed fan  
cooled 3 Ph.  
220/440 Volt.

Internal or  
External.  
Equally as effi-  
cient on fine preci-  
sion or heavy production  
work. Internal Spindles up to 48" long.

*Send for individual descriptive circular.*

Agents and Dealers—Some Desirable territory open.

**F. A. MAXWELL COMPANY**  
300 S. BROADWAY, BEDFORD, OHIO

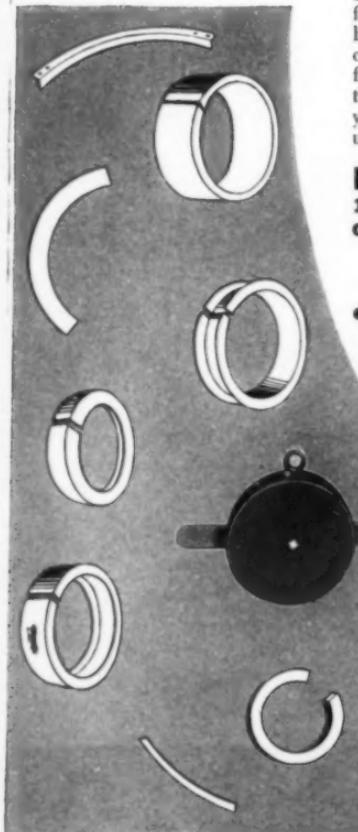
The purchase orders grouped in this illustration are representative of those received by Modern Collet for the rebuilding and modernizing of screw machines. The concerns, whose orders are shown, are merely a few of the well-known manufacturers whose names are on the Modern Collet customer list for this type of work. The

majority of these companies have sent in many repeat orders.

There are many excellent reasons why companies such as these make constant use of this service. We'll be more than glad to acquaint you with all the details . . . with absolutely no obligation on your part.

MODERN COLLECTOR MACHINE CO.  
402 South Main Street, Kalamazoo, Michigan

# AIRCRAFT Plants Make 3 -Point Landings on Production Schedules!



Fast moving on the production line as their finished ships are in the air—American Airplane Manufacturers are meeting almost unbelievable schedules.

In a large percentage of these aggressively-managed factories, Buffalo Bending Rolls are helping to build better planes—faster. Used to bend any shape into arcs, circles, or spirals—easily operated by unskilled labor—fast, dependable, accurate—Buffalo Bending Rolls are the real answer to many a production “bottle-neck.” If you’re interested, write for Bulletin No. 352, and tell us what you bend.

**BUFFALO FORGE COMPANY**  
161 Mortimer St., Buffalo, N. Y.  
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

*“Buffalo”* **BENDING ROLLS**



# The New PROCUNIER

# UNIVERSAL

If you're seeking maximum production tapping, with accuracy, flexibility, dependability and economy, you'll be interested in the new PROCUNIER Universal.

It offers remarkable speed and precision tapping on production jobs, plus three revolutionary features:

**1**—Four speeds ranging from 395 to 2050 r. p. m., handling a wide range of jobs efficiently for which conventional high speed tapping machines are inadequate.

**2**—One machine handles tap sizes from No. 2 to  $\frac{1}{2}$ " through two interchangeable tapping heads.

**3**—Extra long spiral compensating springs conveniently located, with wide range hand screw adjustments, maintain pre-set tap feeding and reversing pressures independent of operator.

Whether for highly specialized production, or work involving wide variations, the PROCUNIER Universal offers outstanding advantages.

*Write TODAY for Catalogs 37 & 38.*



**PROCUNIER SAFETY CHUCK CO.**  
14 SO. CLINTON ST., :: CHICAGO, ILL.

# Lower PRODUCTION COSTS!



By use of

## DURO PRECISION BALL BEARING DRILL PRESSES

A Chicago Manufacturer reports a surprising reduction in his production costs on these drilling and tapping operations since installation of this battery of four Duro Precision Ball Bearing Drill Presses. The operator moves quickly from one spindle to the next for continuous production. Just one set up where two were formerly required. And what is equally important, this new equipment costs less than  $\frac{1}{2}$  as much as his older and less efficient equipment.

Let us show you how you too can reduce your costs by installing modern precision tools.

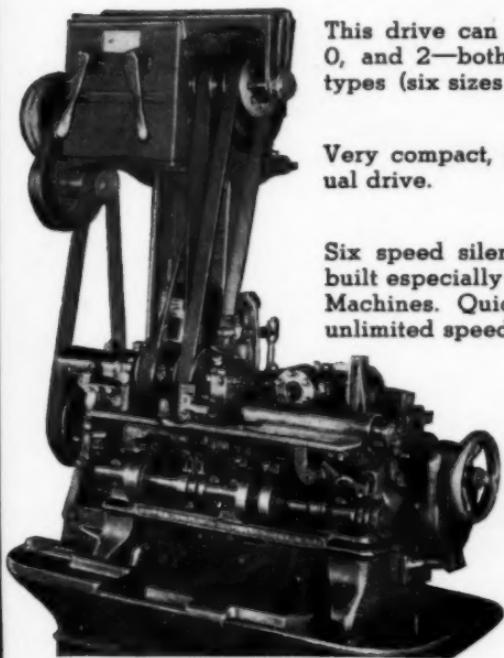
*Manufactured By*

*The Makers of America's Finest and Most Complete Line of Power Driven Machinery.*

**DURO METAL PRODUCTS COMPANY**  
Dept. BB-1 2655 N. KILDARE AVE., CHICAGO, ILLINOIS

# TURNER GEAR BOX DRIVE

## for Brown and Sharpe Automatic SCREW MACHINES



This drive can be furnished for sizes 00, 0, and 2—both standard and high-speed types (six sizes in all).

Very compact, quiet and efficient individual drive.

Six speed silent sliding gear transmission built especially for Brown & Sharpe Screw Machines. Quick change of pulleys gives unlimited speed range.

Anti-friction bearings throughout. All steel, heat-treated gears running in oil.

Can be installed without drilling in one hour.

**DEALERS:** Write for prices and literature!

**USERS:** See your dealer or write for full facts!

Patents Pending

Turner Uni-Drives built for lathes, shapers, radial drills, turret lathes, vertical mills, etc.

**THE TURNER UNI-DRIVE COMPANY**  
1638 Central St., Kansas City, Mo.



**SAVE ALL  
WAYS**

*with*  
**R AND L**

*Save Time*



The R & L Turning Tool is capable of doing many different jobs at a single setting, saving hours of setting-up work. And the multiple operation features save in operation time by doing two or three jobs simultaneously . . . drilling, turning and burnishing in one operation, for example.

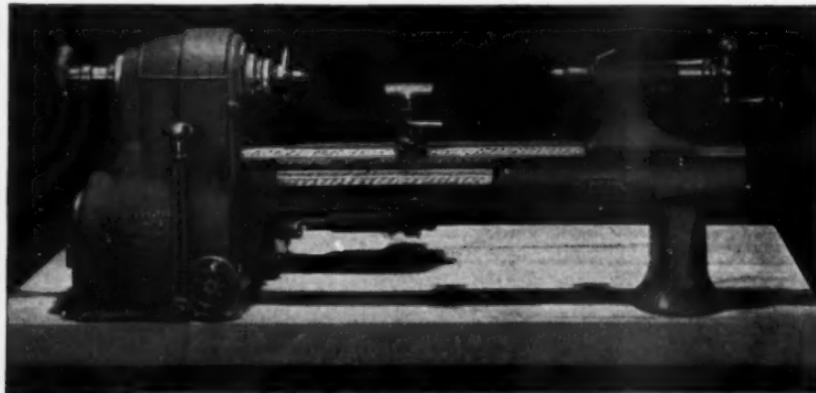
*Save Money*



In first cost alone, you save as much as \$200, as that is what separate tools would cost you to do right and left hand jobs of turning, pointing, centering, etc. Then there are the savings, pointing, speeding up operations . . . and important savings in maintenance because R & L tools are simple and sturdy, with a minimum number of wearing parts.

*Write for full details.*

**R and L Tools**  
**NICETOWN, PHILADELPHIA, PA.**



DON'T BUY UNTIL YOU HAVE SEEN THE

# NEW--"Stark"

Integral Drive  
Precision Bench Lathe  
PATENTED

ITS BUILT-IN DRIVE LEADS ALL COMPETITORS

The first tool of its class with built-in motor and speed changing mechanism, entirely eliminating millwrighting.

Nothing under the bench . . . nothing overhead. Special bench or even bolting to bench, unnecessary.

The  $\frac{1}{2}$  h. p. geared ball bearing motor drives through a disc clutch and vertical V belt sheaves, and through V belts to the headstock, giving any speed at the turn of a wheel (located in front of lathe) from 156 to 2200 r.p.m. in Standard Model, and 260 to 3500 r.p.m. in High Speed Model. Speeds registered on a neat indicator.

Simply moving control lever to right engages the clutch, vertical position

releases, moving to the left instantly brakes the moving spindle.

Time-tried Stark double taper bearings in Standard Model. Best precision preloaded anti-friction bearings in High Speed Model.

Both  $\frac{3}{4}$  and 1 inch collet capacity furnished in either model . . . 9 inch swing . . . 40 inch length of bed . . . Weighs 310 pounds . . . Takes regular Stark Attachments, Collets and Chucks.

Stark accuracy and stamina are traditional . . . incorporated in this streamlined new lathe.

Priced at only slightly more than other precision lathes with SEPARATE complicated drives.

**STARK TOOL CO.** WALTHAM, MASS., U.S.A.



SCIENTIFICALLY  
HARDENED

PRECISION  
GROUND

## AMERICAN INDUSTRIES

WERE QUICK TO RESPOND TO THE ANNOUNCEMENT OF MIDWEST'S NEW HARDENED SLEEVES and HERE'S WHY—

1. Perfect tool alignment is assured by concentricity of the precision ground tapers of Midwest Hardened sleeves and extension sockets.
2. Drill breakage, due to run-out caused by surface mars on the ordinary type sleeve, is now reduced to an absolute minimum.
3. Tool costs are definitely lower, because a Midwest hardened sleeve has a greatly increased length of life compared to the ordinary soft sleeve.
4. Immediate shipments are made from stock at minimum prices.

\**Bulletin 16-J*  
sent at your request, enables you to have complete information at your finger tips.

**MIDWEST TOOL & MFG. CO.**

2331 W. Jefferson, Detroit - - - - Offices in all principal cities.



**CENTRIFUGAL  
COOLANT PUMPS  
AND  
BY-PASS OIL  
RELIEF VALVES**

Compact and efficient new coolant pumps designed to handle coolant containing chips and abrasive material. There is no packing to wear. A short motor shaft extension drives the free floating impeller. A special patented seal seats against the pump housing, leaving motor shaft free from wear. Coolant can be throttled down or shut off while motor is running without injury to pump or motor. The Master motors are of the ball bearing splash-proof type.



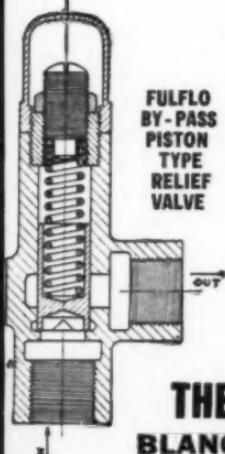
Symbol  
FVM  
Vertical  
Type



Symbol FHM  
Horizontal Type

Pump discharge is 1". Horizontal unit is tapped for 1 $\frac{1}{4}$ " suction pipe. Mounting flange permits bolting vertical pump to side of tank or machine. At 1725 r.p.m., with 1" pipe and a 5' head these pumps will deliver 30 gallons per minute. With a 1" nipple and 1 $\frac{1}{4}$ " hose on discharge they will deliver 45 gallons per minute at a 5' head.

FULFLO BY-PASS PISTON TYPE OIL RELIEF VALVES are available in cast iron or bronze, with pipe sizes from  $\frac{1}{4}$ " to 1 $\frac{1}{2}$ ", for pressures up to 350 lbs. May be equipped with brass, hardened steel or stainless steel pistons.



*May we send you complete information  
on the FULFLO Line?*

**THE FULFLO SPECIALTIES CO., INC.**  
**BLANCHESTER** **OHIO**

**STEADY Flame STEADY Heat**  
**WITHOUT**  
**Pumping**

**NATIONAL**  
**PUMPLESS SAFETY TORCH**



Feature for feature, dollar for dollar, National Pumpless Safety Torches are the greatest torch value on the market. Elimination of the old fashioned pump alone makes them a great value—But their many other exclusive features have proved them to be unequalled in Safety, Economy and Efficiency.

Do not confuse National Pumpless Torches with wick-fed torches. National design and construction provides the correct operating pressure within the tank with more than ample safety without the necessity of continuous pumping of oxygen into the tank—tests have proven that they deliver 2400° Fahrenheit and a flame that is fully adjustable for any purpose for which a blow torch is used. They burn from full to empty without any attention whatsoever.

*Free*  
**COMPLETE  
DETAILS**

*Just drop us a post card today and ask for our latest circular giving complete information about their construction and operation.*



**NATIONAL SAFETY DEVICE CO.**  
**836 W. HUBBARD ST., DEPT. BB-12**  
**CHICAGO. ILLINOIS**



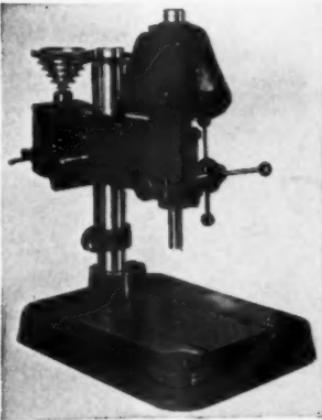
# CANEDY - OTTO

## No. 18 ROYAL

### *Floor and Bench Model Drills*

**Featuring:**

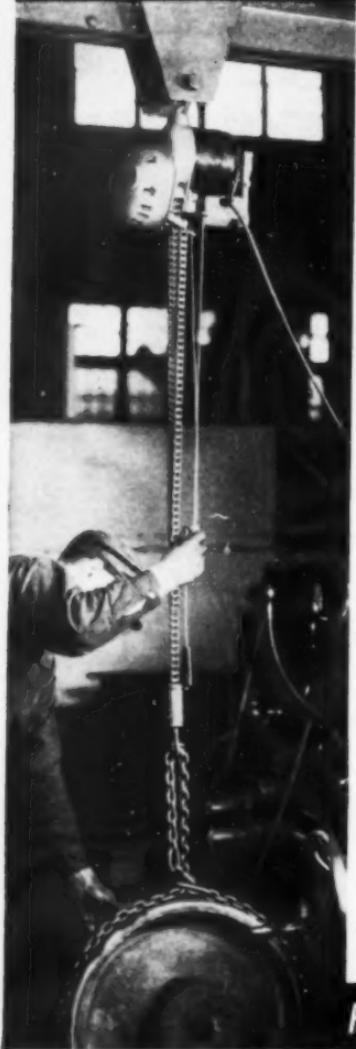
6 Speeds, 240 to 2185 with 1200 r. p. m. motor—345 to 3250 with 1800 r. p. m. motor.  
 18° swing 5 1/4" spindle travel.  
 Sand cast, machined V-belt pulleys.  
 Alloy steel 6-spined spindle, ground and polished.  
 High grade Lubri-seal ball bearings throughout.  
 Spindle cone pulley rotates between annular ball bearings.  
 Bench base working surface 16 1/2" x 16", over all 21 1/2" x 28".



These are sturdy, dependable drills, capable of accurate drilling on rigid day-after-day production schedules. Supporting columns are rugged. The Lubri-sealed bearings assure easy running and long life. Working surface is handy—and the three spoke feed is fast and easy to operate. Capacity up to 3/4" with 1/2 h. p. motor, or up to one inch with 3/4 h. p. 1200 r. p. m. motor.

**CANEDY - OTTO MANUFACTURING CO.**  
 CHICAGO HEIGHTS, ILLINOIS

# Portable Electric 'BUDGIT' HOISTS



## SAME PRODUCTION - WITHOUT OVERTIME

Here is one way to get 44 hours production in 42 hours *without overtime*. Use "Budgit" Hoists to do the lifting that you now do manually! . . . They salvage 20% to 40% *and more* of the "waiting" time of machines and men that is lost when lifting is done by hand or with chain hoists. "Budgit" Hoists are available in 250, 500, 1000, and 2000 pounds lifting capacity with speeds to suit today's tempo. . . . They quickly earn their low cost *over and over again out of savings*. Prices start at \$119. . . . You can put them to work immediately! There is nothing else to buy! . . . You simply hang up, plug into the nearest lamp socket or power circuit receptacle and Use!

- Send for Free Catalog and "Time Savings Calculator" that assists you to determine savings.

**SHAW-BOX CRANE & HOIST DIV.**  
MANNING, MAXWELL & MOORE, INC.  
435 Broadway Muskegon, Michigan

Makers of all types and sizes of cranes and electric hoists for more than half a century.

**HANG UP, PLUG IN, USE!**



## Why hold up production by putting skilled machinists on Tool Grinding?

*Sellers 20W Tool Grinder*

Of course, machinists like to grind their own tools . . . they also have their own ideas of how tools should be shaped and what clearance they should have. All of them cannot be right—a machinist at best seldom grinds two tools alike.

Why pay skilled machinists to grind tools? An expensive machine stands idle . . . production is held up! Have your tool room attendant do this job. With a Sellers Tool Grinder, he can grind tools better than the best machinist can by hand . . . and in less time. Less tool steel will be wasted and the tools will last longer and cut better. And your machinist can be kept on the work you are paying him to do.

If you are looking for a way to save money and keep production at peak, we know you will want more information about Sellers Tool Grinders.



**WILLIAM SELLERS & CO., Inc.**  
616 HAMILTON ST. PHILADELPHIA, PA.



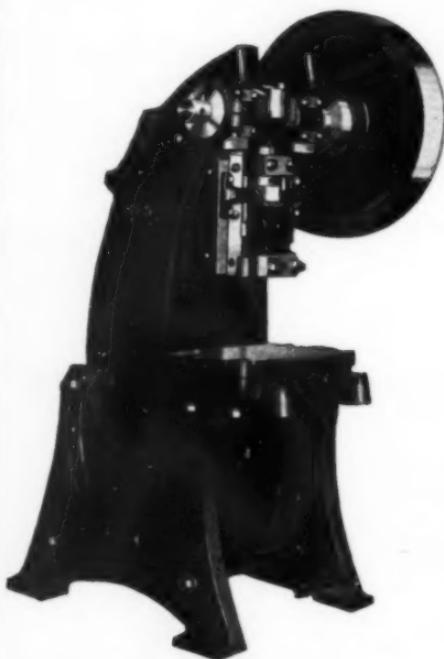
# Sellers

PRESSES DESIGNED AND BUILT BY

# MARSHALLTOWN

GIVE BETTER PRODUCTION AND LONGER LIFE

★ GET THE MOST FOR YOUR MONEY ★



No. 5 FLYWHEEL TYPE



The Marshalltown Line includes inclinable presses from 5 ton to 70 ton capacity.



Features of design include more die space, chrome nickel cranks, wrist pin connections and many other proven elements of correct design.



Literature fully describing this sturdy, dependable line of presses will be sent on request. It will pay you to investigate.

## MARSHALLTOWN MFG. CO.

900 East Nevada Street,

Marshalltown, Iowa



## SPECIFICATIONS:

Price listed includes 3-Speed Gear Box, Support Brackets and Motor Rails.

4-Speed Units—\$10.00 additional.

Power take-off on either end of unit optional.

Gears are heat treated and run in oil.

Pulley Shafts— $1\frac{1}{4}$ " dia., fitted with ball bearings and special oil seals.

Belt adjustments provided.

Designed to drive machines that require from 1-HP to 5 HP motors.

Brackets for most types of tool-room and production machines in stock.

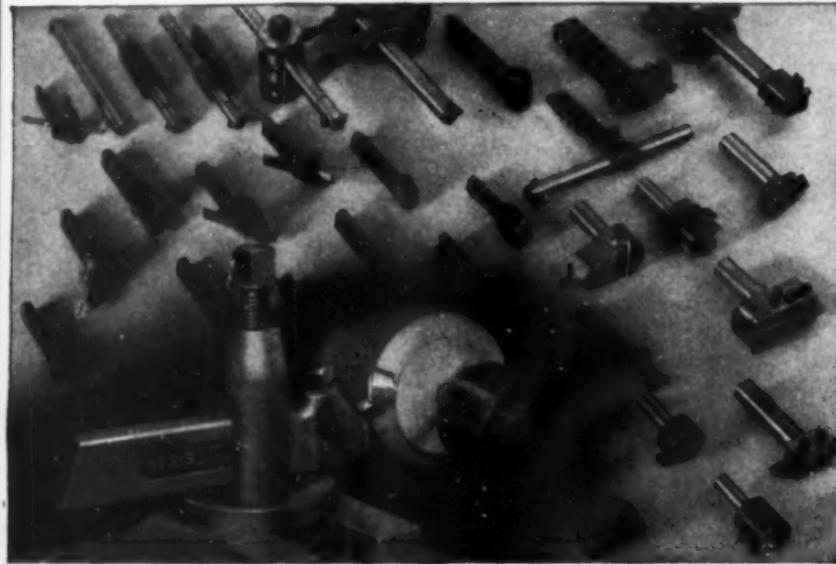
**PRICE**

**\$87.50**

**DRIVE-ALL MANUFACTURING CO.**

3401 CONNER AVE. : : DETROIT, MICHIGAN

# ARMSTRONG



## IMPROVE QUALITY, INCREASE OUTPUT and LOWER COSTS WITH ARMSTRONG TOOL HOLDERS

You will do better work with the right ARMSTRONG TOOL HOLDERS on any lathe, planer or shaper, for it will give you maximum strength and rigidity, maximum clearance and visibility, will be correct in design, in cutting angle and approach, and will provide a cutting point to the finest cutting steel. You will get smoother, more accurate threads, will be able to cut-off even the largest and toughest pieces with ease, will avoid loss through tool failures, breakage and mishap, can plane tops, both sides on a planer with same tool (illustrated)—can set the cutter in any of 10 positions or reverse the entire tool to make it a "goose necked" tool. Will produce more work at lower tool cost.

With a complement of ARMSTRONG TOOL HOLDERS (the correct Tool Holders for each operation) you can increase output at will, for each has the strength for speeds and feeds far beyond "normal" shop practices. You will save "getting ready" time too, will be permanently tool-ed up and waiting machine hours will be turned into producing hours and lost time into profits.

Write today for the new ARMSTRONG C-39 Catalog. Check up your present tool set-up. You can always pick up ARMSTRONG TOOL HOLDERS as needed from stock at your local mill supply house.

**ARMSTRONG BROS. TOOL CO.**

"THE TOOLHOLDER PEOPLE"

308 N. FRANCISCO AVE.,  
Eastern Sales: 199 Lafayette St.,

CHICAGO, U. S. A.  
New York



ARMSTRONG TOOL HOLDERS Are Used in Over 95% of the Machine Shops and Tool Rooms

# HITCHCOCK'S *Machine Tool* BLUE BOOK

**Selected  
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**26,000  
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JANUARY, 1940

THIRTY-FOURTH YEAR

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# New Catalog of South Bend Lathes

● This new catalog describing the entire line of South Bend Lathes, Chucks, Tools and Attachments is just off the press and is now ready for distribution. It is the most complete lathe catalog ever published. Never before have so many different sizes and types of lathes been illustrated in a single catalog. Every user of machinery should have a copy of this valuable catalog at hand for ready reference.

## Mailed on Request

A copy of this new South Bend lathe Catalog No. 100 describing 9" to 16" Swing South Bend lathes and accessories will be mailed on request to any address, postage paid, no obligation. Size 8½" x 11" for standard size. Contains 112 pages and 50 illustrations.

Write Today  
For Your  
Copy



16" Tool Room Underneath Motor Drive Lathe

1" Collet, 9" Swing Precision Lathe

## SOUTH BEND LATHE WORKS

THE BUILDERS SINCE 1906

766 E. Madison St., South Bend, Ind., U.S.A.





# The EDITOR'S PAGE

## Looking Ahead . . .

Business prospects for 1940 are reassuring. Heavy industry provided the backbone for the recent upturn. It faces the future with a huge backlog of unfilled orders . . . undoubtedly the greatest since 1929.

Some buying momentum was lost after the initial war stimulation. But orders already on the books should maintain employment at comparatively high levels for a considerable time.

Aircraft and shipbuilding are reported to be dividing an order backlog of approximately \$1,200,000,000.

As the production pace on airplanes and engines is accelerated, payrolls should swell.

The machine tool industry is reported as booked almost solid for the first half of the New Year, with the index standing at 91.2 for November as compared with 52.5 for last January.

In electrical supplies, automobiles, steel, construction, railroad equipment and many other lines, activity is on the increase.

In some quarters, apprehension was felt because consumption has not kept pace with the production rise. After all, consumption is difficult to gauge but generally, it is believed that inventory accumulations have been additions to an abnormally low level. High production has not been maintained long enough for the building of excessive inventories.

Our sincere hope is that the New Year will be bright and successful for all our readers and advertisers.

## Greetings . . .

We welcome into our reader family, the officials of 650 important Canadian firms. Also many new readers in South America. From the standpoint of the

advertisers, this is especially significant in view of the current European turmoil.

## Contrasts . . .

A recent flying motor trip to the far Southwest provided an interesting study in contrasts. The mountains and desert in New Mexico were refreshingly quiet and peaceful after the hurry and bustle of State Street Christmas shopping. Traveling Southward each day seemed like turning back the calendar . . . from the frosty roads of Illinois to the brilliant sunshine and agreeable warmth of the Southland.

## "Progress"

"Progress is a tremendous force in human existence. It sweeps inexorably forward, acclaiming today, as scientific fact that which—10 years ago—was only scientific theory. Frequently, it refutes, in the actual culmination of some scientific advance, the very forward step which—a decade ago—science declared impossible.

"In all of its varied manifestations, progress produces benefits which are incalculable . . . Because of progress in building construction, we have better homes . . . Because of progress in manufacture of household appliances, we have more comforts, greater conveniences . . . Because of progress in automotive manufacture, we have better automobiles . . . Because of progress in transportation, we have faster, more comfortable trains . . . Because of progress in aviation, we have safer airplanes . . . Because of all the benefits of progress, every one enjoys a higher standard of living.

"Progress drives us onward . . . It forbids our standing still!"

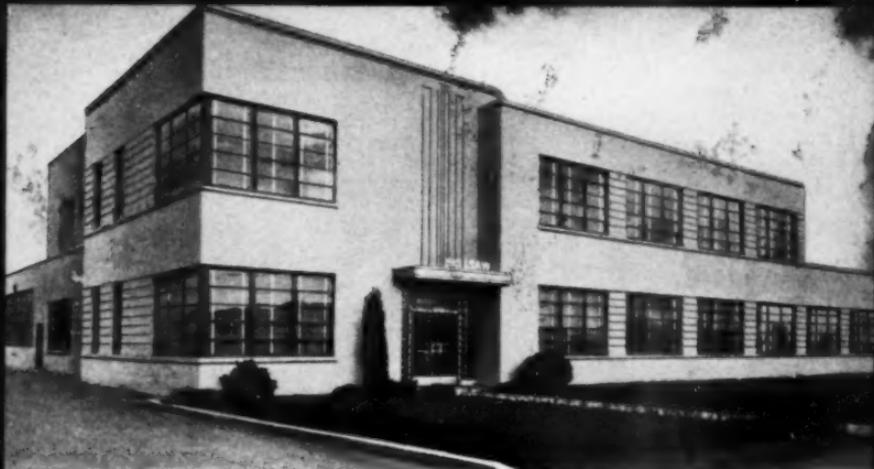
(The James F. Lincoln Arc Welding Foundation).

# RYERSON STEEL IN STOCK



DAY, you can be sure of the same dependable steel deliveries have characterized Ryerson's service to industry for nearly 100 years. Ryerson stocks of certified uniform high quality steel are ample, deliveries are prompt. A special quality control plan on Alloy Steels includes selection of special heats, identification, testing, and heat treatment information on every bar shipped. 10 large Ryerson plants carrying more than 10,000 sizes, kinds, and shapes of steel stand ready to meet both your regular and emergency requirements. Write for Stock Sheets. Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, Cincinnati, St. Louis, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.





# PRODUCING the Skilsaw Line

A little journey through the splendid new Skilsaw plant, noting some of the modern equipment and methods used in producing this well-known line of portable electric tools.

**P**ERFORMANCE is the primary basis on which portable electrical tools are selected and used. Graceful streamlined design may catch the eye—ingenious gadgets may excite interest. But after all, the user wants performance. He wants ample power, easy handling and rugged dependability.

Little does he realize the research and study, the careful workmanship and precision manufacturing equipment necessary to deliver all that he expects in his portable tools.

It means building plenty of horsepower into the compact little motors, for space is at a premium. It involves static and dynamic balancing for smooth operation at high speed—precision cut gears—scientific heat treating

and hardening—ball or roller bearings—skilfully designed, accurately made housings that will take hard knocks and withstand hard usage and many other tough engineering problems that the tool user just takes for granted.

All of these important matters receive careful consideration and study at Skilsaw, Inc. Less than 20 years' old, this progressive organization recently moved into a handsome Austin-built factory at 5035 Elston Ave., Chicago—the fourth important expansion during its brief career. And before really getting settled in the attractive and roomy new quarters, an addition is being rushed through to completion which will materially increase the shop area.

L. E. Parker, Superintendent, is in



Glimpse into a busy corner of the Production Department

charge of design and production and he has a capable staff of assistants and helpers. The machine equipment reveals a progressive policy of adopting the latest developments that contribute to betterment of the product. In fact, on almost every visit at the plant new machines are in evidence.

Designs and improvements come into being on the drafting boards, but they are hatched in the Tool Room and Experimental Department. This important section is roomy and well equipped with the products of such well-known firms as Brown & Sharpe, Cincinnati Milling Machine Co., Hendey, Abrasive Co., South Bend Lathe, Gould & Eberhardt, Canedy-Otto, Fosdick, Peerless Saw, Baldor grinders, etc. An unusual assortment of bench and portable

tools is also in evidence.

Cutaway illustrations on these pages of two of the products, reveal details of design and skilful disposition of internal parts. Passing on into the plant, we'll observe how some of the parts are made.

First of all is a battery of five No. 3 Barber-Colman gear hobbing machines and two No. 12's. These are used in producing the helical gears for the drills — and the worm gears for the saws. Extreme accuracy is necessary, for these gears reconcile motor speeds to the required chuck and saw speeds.

Gear blanks are of chrome-nickel molybdenum stock. Gear wheels are mounted on shafts by means of Woodruff keys. Ground diameters are held to an accuracy of .0005". Pinions are hobbed directly on armature shafts to assure accuracy and to reduce the number of parts. It is very evident that there is no mad rush to raise production. Quality and accuracy are stressed everywhere.

Heat treating and hardening of the gears is handled in the latest type of electric furnaces. Standard practice contemplates the accepted method of meshing a hardened pinion with a heat treated steel wheel for all models of Skilsaw drills.

Spindle threads for the chuck mounting are milled, to assure concentricity and to eliminate chuck wobble which causes oversize holes and breaks drills.

In the final checkup, gears are



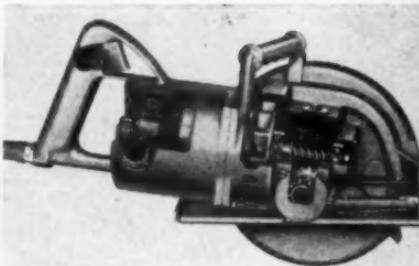
checked for correct depth of tooth and pitch diameter on fixed centers and must be accurate to within .0002". In addition, a Jones & Lamson comparator is used to check for proper tooth shape and correct pressure angle. This interesting testing machine projects magnified shadows of the gear teeth to permit precision inspection.

In the Skilsaws, the circular saw blades run parallel with the motor shafts and compact worm-gear speed reduction units are employed. These right angle drives transmit power to the blades at the most effective sawing speed and permit maximum depth of cut for a given blade diameter.

Chrome - nickel molybdenum worm blanks are first rough ground. Then each is individually mounted on a splined arbor and hobbed. Then the worms are carefully heat-treated, and the heat-treating is repeated a second time to minimize distortion. Then each worm receives an individual Rockwell hardness test.

Worm threads are then carefully ground to correct any possible distortion. This removes potential causes of friction and assures quiet, smooth running.

Worms receive a final test on a Hanson-Whitney machine to determine cor-

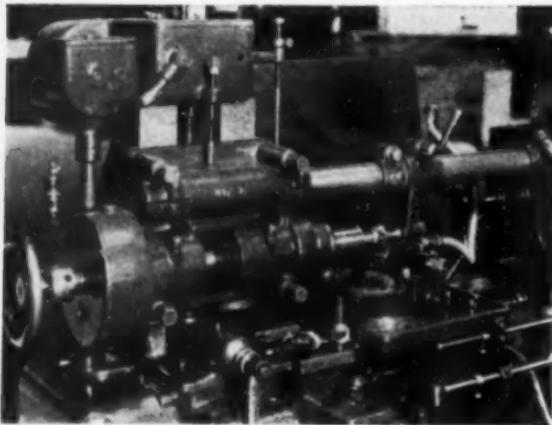


rectness of indexing, lead and helix angle. An accuracy of .0002" is maintained.

The same care is exercised in production of the worm wheels. Blanks are first rough machined from centrifugally cast tough bronze alloy—permanently spline-mounted by pneumatic presses on their individual shafts. Centers are lapped on a new Ex-Cell-O center laper. On these centers, the worm wheel teeth are generated. Worm wheels and worm gears are matched and tested in pairs to assure quiet and trouble-free operation.

Although Skilsaws were originally designed for sawing wood, they are now being used extensively for cutting other materials. Fine tooth wheels are





Gear production requirements are served by a battery of seven hobbing machines. The helical gears are cut from chrome-nickel-molybdenum blanks.

available for Celotex and other soft wall boards — shallow notched steel discs for cutting light gauge flat or corrugated iron sheets by friction or burning — high speed hollow ground blades for cutting sheet and tube copper, brass, bronze and aluminum — and Bakelite abrasive discs for cast iron and metals of low tensile strength, as well as special discs for alloy steels.

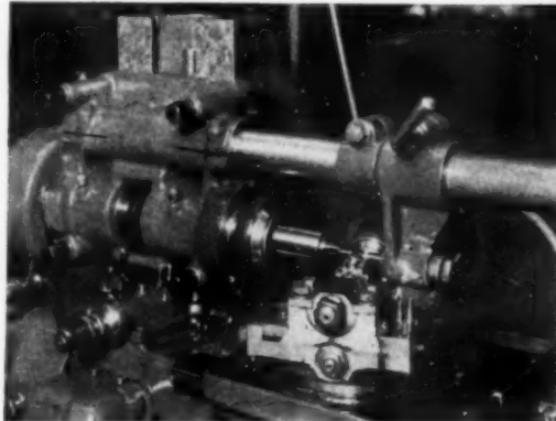
Passing on from the manufacture of transmission parts, we notice a new XL12 Oilgear horizontal broaching machine, used for internal broaching on

aluminum sander drums and similar operations.

Housings for the various Skilsaw tools are vitally important parts calling for skilful design and precision manufacture. In addition to enclosing the motors and other working parts, they must provide accurate mountings for alignment of the bearings, and substantial and convenient handles for holding the tools, while they are being used.

Bodies are of die cast virgin aluminum alloy, which assures accuracy and interchangeability of parts and pro-

Pinions are hobbed directly on armature shafts to assure accuracy and to reduce the number of parts. Hardened pinions are meshed with heat treated steel wheels.



# SET STUDS



## THE MODERN WAY

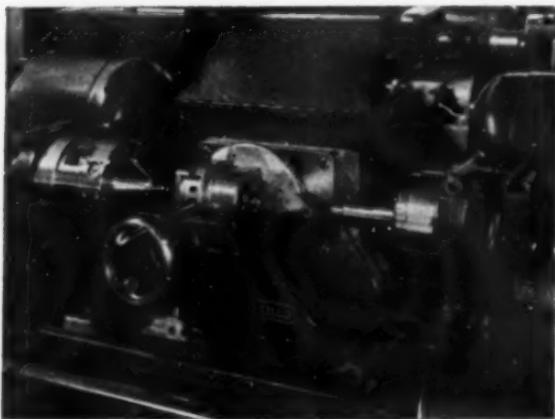
For many years, the MODERN Self-Opening Stud Setter has been used by the vast majority of automobile, aviation and other high production plant just as this axle plant does.

Simplicity in operation that gives speed and clear unmutilated threads plus rugged construction make this Stud Setter first choice wherever studs are used—in cast iron, steel, die cast metal or wood.

If you are not now using the MODERN Self-Opening Stud Setter, you soon will be, once you learn what it can do for you. Send for Bulletin 185 which gives you more information on this time and money saving tool.

**MODERN TOOL WORKS**  
ROCHESTER • NEW YORK

This clever jig holds the die cast aluminum portable saw body, rigidly and accurately during the boring and turning operation, assuring accurate alignment of the bearings.



vides a dense, smooth surface.

Two new Ex-Cell-O boring-turning machines are used in housing operations. The closeup photos show details of some of the interesting jigs and fixtures. Carboloy cutting tools are used and the housings are bored and faced accurately and at a rapid rate.

Another brand new tool is a No. 12 Cincinnati cutter grinder.

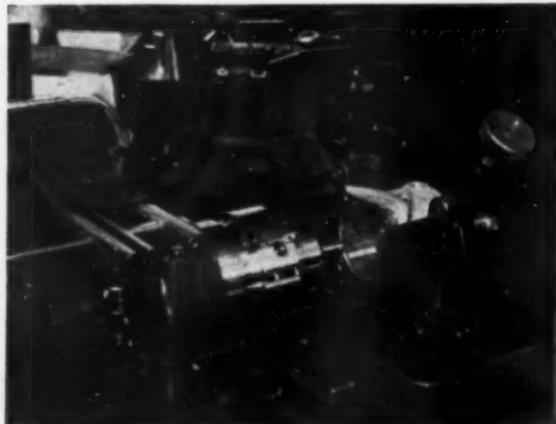
A closeup view shows a Cincinnati No. 2 L-type plain milling machine, equipped with a high speed universal milling attachment arranged for a quill

hand feed. The operation is on a sander suction fan housing.

A Kearney & Trecker plain milling machine, No. 13 is also in use on routine operation as well as a new Nichols hand miller.

A Wood turret lathe with tilted turret, Cullman drive and air operated chuck was busily engaged in turning some special brass bushings. Several of the other machines have Cullman drives.

Brown & Sharpe and Norton cylindrical grinders are used for grinding



Another jig which facilitates boring and facing operations on motor housings. The aluminum bodies are slipped into place easily and quickly and interchangeability is assured.

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NEW and BETTER  
GRIP SLEEVE

—easy on  
operator's hands

BALL BEARINGS

—eliminate  
friction for quick  
smooth operation

NEW NICKEL  
MOLYBDENUM  
ALLOY STEEL

Jaws and Nut

GRIPPING  
POWER

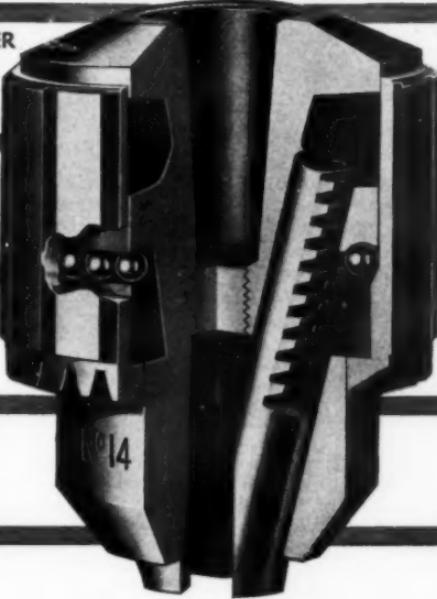
greatly increased

SLEEVE INTERNALLY  
GROUND ON  
3 DIAMETERS  
for perfect balance

Removal of Screws  
converts Chuck to  
HOLLOW  
MODEL

ATMOSPHERICALLY  
CONTROLLED  
HEAT-TREATING  
for Jaws — Nut — Sleeve

COARSE PITCH  
THREADS  
on Jaws and Nut



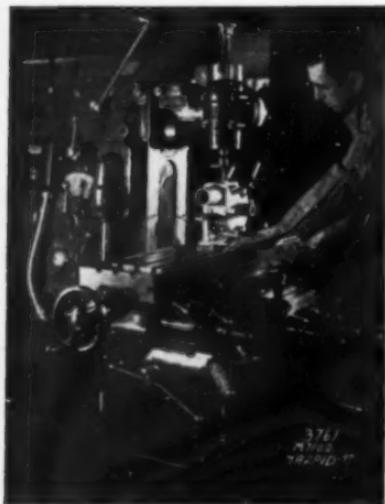
## FOR GREATER STRENGTH FASTER OPERATION!

THE JACOBS MANUFACTURING COMPANY, HARTFORD, CONN.

shafts. These shafts are of chrome nickel alloy steel, heat treated for maximum toughness, and bearing seats are ground to .0004" limits.

Radial and thrust bearings in the Skilsaw line are of high quality, ground and lapped.

Two Leland-Gifford multiple spindle drills with four individual motors are used in some of the various drilling operations.



Further drilling capacity is provided by two Cincinnati-Bickford super service drills, and by a number of individual Delta drills throughout the plant.

Three Gisholt No. 3 turret lathes are employed for a number of operations. One of these was busily turning down and facing the die cast aluminum fans which provide ventilation within the tools and cool the motors.

Two Hammond heavy duty grinder-buffing machines are used in outside finishing operations on the housings.

Several Hannifin pneumatic arbor presses handle some of the pressing operations. One of these was pressing together the freshly cemented joints of sander belts. Hand operated Green-erd and Sheldon arbor presses are provided at several points in the assembly

line.

A Consolidated No. 24 press punches out oil hole caps and other small parts.

A Grant riveter and a Gallmeyer & Livingston disc grinder are also being used to advantage.

Long benches are used for the assembly lines. Here the inspected finished parts are assembled and the completed units pass on to an exacting electrical test.

At the outset of the company's operations, a single electric portable saw was made. A little later the line was expanded to include three models of the saws and a portable belt sander.

The turning point came in 1930, when building activity abruptly halted. The few building contractors who had jobs in progress, hesitated about buying Skilsaws. Attempting to meet the situation, a lower priced model was developed, but this was not the solution. Contractors wanted the higher priced saws but didn't like to spend the money under prevailing conditions.

Then Skilsaw studied the market and discovered the industrial sales possibilities. Previously, some 85% of the business had come from the building field and 15% from industries. Today the business is about equally divided between the building and industrial fields.

Further study revealed that portable drills offered heavy potential volume in the industrial field. This resulted in the development of six models of portable drills which were found inadequate to meet the size range demand already created by competition. This meant Skilsaw could not expect to build or hold a dealer organization with just a partial drill line, and it was decided to enter the portable drill line in earnest with expansion of the line to its present 21 models, adding portable blowers, disc sanders, bench grinders and a hedge trimmer. The business sales curve has shown a steady and consistent climb upward.

Skilaw's marketing activities are headed by Edward W. Ristau, Vice President, who pioneered with the Company through the sales division, and is in charge of advertising and promotion.



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show a few of  
the many **WYCO**  
**FLEXIBLE SHAFT**  
**MACHINES**



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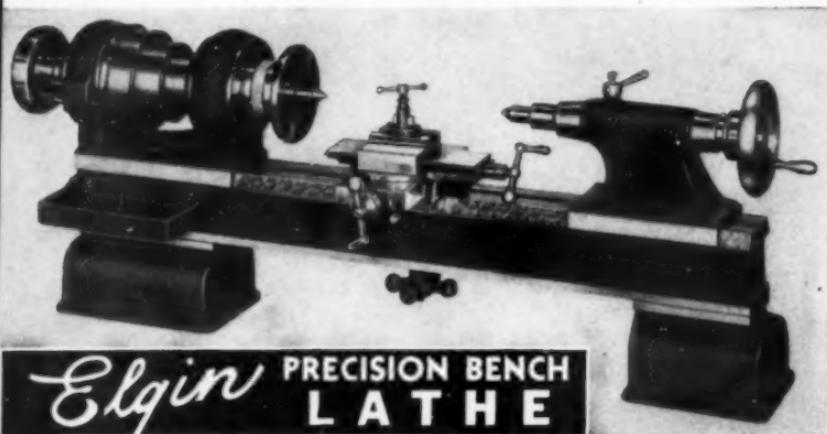
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WYCO CONCRETE VIBRATORS  
GASOLINE POWER UNIT



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# SUPERFINISHING—

## What It Is - What It Does And Its Influence On Longer Maintenance Of Accuracy

By E. L. Hemingway,

(Experimental Engineer, Foster Machine Co.)

IT WOULD BE interesting, if space permitted, to trace the improvements in machining methods and their relationship to the fits and clearances used in moving mechanical parts since the difficulties experienced by James Watt in building his first steam engine. Considerable water had gone over the mechanical dam from that time up to the development of the automobile. Yet, most of us will agree that the development of our modern machining methods has been mainly due to efforts of the motor car manufacturers to produce a quieter, less costly, and more dependable product.

The lessons learned during the evolution of mass production of automobiles were not wasted upon makers of other mechanical appliances. All of them came to the realization that, only by close attention to proper clearances and good surfaces, could long life and accurate performance be assured to their products. This close study of these two conditions has resulted in increasingly smaller clearances and a demand for improvement in surface quality so that still closer fits can be employed. It would seem, then, that further improvement in the quietness, accuracy, and length of life of many mechanical devices is considerably dependent upon continued betterment of bearing surfaces.

Several questions now arise:—What conditions are essential to bearing surface quality? In what way are those to which we have become accustomed deficient? What are the prospects for their improvement?

### What Is Desirable in a Bearing Surface?

It appears to me that the perfect conditions for the bearing surface of a cylindrical part would be as follows:—The surface would be absolutely round and smooth, in perfect alignment with the mating surface, and with the minimum of clearance compatible with proper lubrication. Needless to say, none of these ideal conditions are realized in commercial production; consequently the surface should be as hard as possible to the very outside layer of atoms, so that any mis-alignment would do a minimum of damage.

While, for reasons of economical manufacture, corrosion conditions, or other special reasons, it is often desirable that shafts, etc., be made of soft steels, or other soft metals, instead of hardened steel, it is at least important that they be of as perfect shape and smoothness as is commercially practicable, in order that there be no high points on the surface to rupture the oil film and set up abrasive conditions.

### Deficiencies of Common Finishes

Up to this time, by far the largest proportion of manufactured parts have received their final finish by grinding processes. Comparatively few parts with external bearing surfaces have been further improved by lapping; as this method is usually too slow and costly. "Sanding" by means of a strip cloth-coated abrasives has often been resorted to in an effort to better a ground bearing; but close examination of such a surface will usually show it to be ridged.

Grinding has long been in favor as a rapid means of imparting accurate size, and rightly so. However, the quality of the surface so obtained has left considerable to be desired for several reasons.

Among the faults found on the surface of ground parts, are chatter, feed marks and grinding cracks. Also, to my earnest belief, no grinding can ever be done without creation of a layer of disturbed or amorphous metal; and, in case the parts are hardened, a layer of annealed metal in depth from one barely noticeable to one several thousandths of an inch deep. No amount of water flooding the work during grinding can prevent a momentary intense heating of the line in contact with the wheel. This heating may be so intense that the high points of the grinding ridges actually may be decarbonized; thus these points are not only annealed, but also further softened by a reduction in carbon. Lastly, no matter how fine the grit in the wheel, or how carefully the grinding has been done, there still remain those projecting grinding ridges to interlock with similar ridges on the mating part and cause abrading action.

#### How Smooth Is "Smooth"?

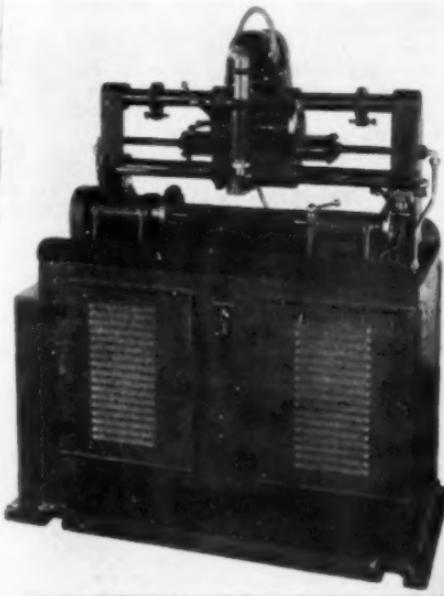
One of the most stubborn obstacles to progress in surface improvement has been the lack of a means of evaluating surface quality. Finger nail and visual tests could not be placed on a blue print. Several devices had been brought out which would give a fair idea of the surface conditions; but none of them was adapted to any kind of routine inspection. However, it has lately become possible through an instrument, known as the Profilometer to inspect any reasonably well finished surface and assign a numerical evaluation to its quality. While the portable model of this instrument does not give any information as to defects such as out-of-roundness, lack of straightness and, ordinarily, as to chatter marks, it does,

accurately and quickly, measure the average depth of machining and grinding ridges.

This aid to surface inspection is making engineers much more "surface quality conscious"; and has apparently ushered in an era of much closer scrutiny of these conditions, as well as an intense desire for their improvement.

#### A New Development in Surface Improvement

Among organizations so interested was the Chrysler Corporation. It was found that the wheel bearings of cars shipped to distant points by rail or truck had been damaged in a peculiar manner. As these cars rocked back and forth during shipment, the rollers of these bearings had indented the races; and upon unloading and operating, they were noisy, necessitating replacement. A thorough investigation as to the cause of this condition revealed a thin layer on the ground



A general purpose Superfinisher for cylindrical surfaces up to 4" diameter and 18" in length.

surfaces of the bearing races which was somewhat soft and easily indented.

This layer, produced by grinding, was found defective for several reasons. First, the crests of the ridges were readily crushed down or leveled off. The heat created during grinding made this action easy, as the hardening treatment previously given was altered by being annealed to at least the depth of the ridges, and nearly always deeper. Further, the violent tearing out of particles of metal distorted the crystalline arrangement of the surface layer. The grinding of these bearing races, then, produced a surface layer which was soft, often even decarbonized, somewhat amorphous, and much rougher than was desirable.

After considerable experimentation, Chrysler worked out a method of removing this detrimental surface layer, by the application of fine grit abrasive stones to the revolving bearing surface, under light spring pressure, and with a flood of light lubricant to remove abraded particles of metal and stone.

The only motion imparted to the stone is a fairly rapid oscillation of about  $3/16$ " amplitude at a right angle to the direction of rotation of the race. Under these conditions there is no possibility of the creation of any consequential degree of heat. For the oscillating motion, there are two reasons. First, the rapid reversal in direction of cut corrects any tendency of the stone to "load." Secondly, the direction of stock removal will be across the ridges caused by the previous operation, reducing the peaks of the ridges to plateaus, or removing the ridges entirely; thus greatly increasing the flat area of the surface.

Compare the surface so improved with the original one as ground. Not only have the grinding ridges been removed, but also the amorphous, annealed and decarbonized layer. The new surface is true crystalline metal. Chatter marks and other small irregularities have been erased. The life of the bearing should be immensely lengthened both from the standpoint of possibility of indentation, and from that of abrasive wear. Its operation will

be quieter and smoother over a much longer period of time.

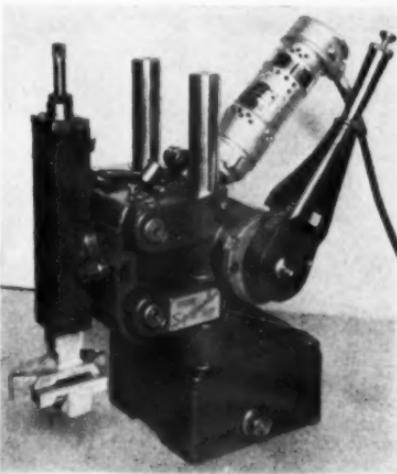
Chrysler gave the name "Superfinish" to this revolutionary method of surface improvement.

#### Different Applications of Superfinish

The complete success attending the Superfinishing of bearing races naturally led to the adaptation of the process to other parts of the car. Soon it was applied to crankshafts, piston pins, valve stems, tappet bodies and heads, pistons, brake drums and shoes, cam-shaft bearings, flywheel clutch faces, and other parts, with equal success.

It was found on inspection with the Profilometer that the usual "finish ground" automotive part checked 10 to 35 micro-inches; and that such parts could be Superfinished to a reading of 2 to 6 micro-inches in less than one minute each.

Other applications followed such as the Superfinishing of plug gauges, reamers, boring and pilot bars, rolls for cold finishing metal strip, arbors, and hundreds of other parts on which a truly smooth or hard surface was desired.



Upright type Superfinishing head attachment for cross slide mounting on engine lathes.

### Equipment For Superfinishing

The Chrysler Corp. felt that the ben-



Nine spindle high production Superfinisher which has been used on gear and tappet faces.

efits of their patented Superfinish process should not be restricted to their product. Accordingly, they granted a license to manufacture the equipment for application of the process by anyone so inclined, to the Foster Machine Co., of Elkhart, Ind. This Company has constructed practically all of this type of machinery used to date by Chrysler. High production Superfinishers are available for all of the above mentioned automotive parts or any others of reasonable size.

In addition, there is a general purpose machine of 6" diameter by 18" long cylindrical capacity, which can be readily converted for tappet head or other flat finishing. Also, there are three sizes of Superfinishing attachments for mounting on the cross slides of engine lathes.

The positioning of these attachments on the lathe is a very simple matter, nothing being required except a clamping or a filler block. With the proper block at hand, the attachment can be mounted in a few minutes.

The only other requirement observed is that essential for the supply of lubricant to the stone. This usually is a pan under the lathe bed, a tank holding a few gallons of the lubricant, and a small pump. The part being Superfinished is held between centers, or in a collet, just as it would be for turning. In case the part is long enough to require traverse, this, also, is accomplished as in turning.

The general purpose machine is entirely self-contained. All that is necessary to place it in operation is to see that the hydraulic oil and stone lubricant tanks are properly filled. The r.p.m. of the spindle has a stepless range by means of an hydraulic transmission from 0 to 350.

The hydraulic traverse of the stone head is instantly adjustable both as to speed and length of traverse, which is automatically reversed. Work may be held between centers, in an air-operated chuck, or in a scroll chuck.

#### Control of Superfinishing Conditions

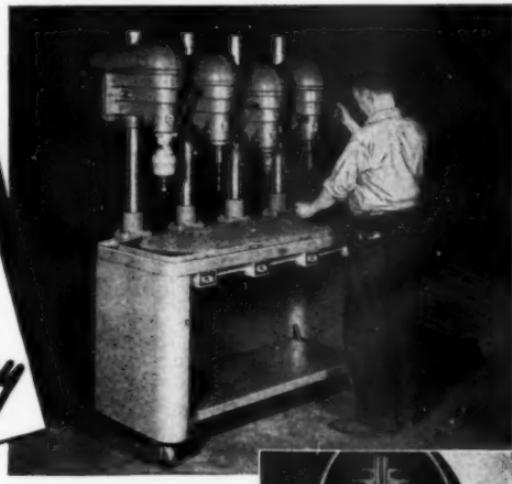
In the operation of any of these machines, there are five easily controlled variables which affect the length of time required for the operation and quality of finish obtained. They are here listed in their order of importance according to my experience:

1. Type of stone selected.
2. R.p.m. or surface footage of the part.
3. Kind of stone lubricant used.
4. Spring pressure used.
5. Traverse per revolution.

To these, might be added two more, the first of which is not ordinarily sub-

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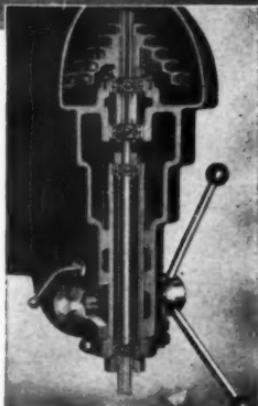
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ject to much adjustment in these machines; and the second of which is controllable only by the grinder.

6. Oscillation speed and amplitude.
7. Quality of surface prior to Superfinish.

Discussing these variables in their order:

Selection of stones is the most important factor in successful Superfinishing. To the uninitiated, proper selection among the hundreds available may seem formidable. Luckily, however, such is not the case. With few exceptions, only one type of bond out of the five available, is suited to this operation, and that is the vitrified. Two kinds of grit are used, the silicon carbide on cast iron, and the aluminum oxide on all kinds of steel. Of the large number of grit sizes made, only six need be employed:—320, 400, 500, 600, 800 and 1000; and I would prefer to use only the 500 and 1000.

The range of bond hardness used is much softer than that found in grinding. The very softest grades available are used in Superfinishing very hard steels and up to medium bond hardness for very soft steels. It is only natural that fine grit stones will cut a little slower but produce a finer finish than coarse ones. To select a stone to Superfinish a given steel part, then, one would choose a vitrified bond, aluminum oxide stone of a grit size 320 to 1000, depending upon the roughness of the part, and the quality of final finish necessary, with a bond hardness inversely proportional to the hardness of the steel. Six to eight different bond hardnesses will take care of all different hardnesses of steel. Sometimes a shellac bond is useful for work on soft steels under  $\frac{3}{4}$ " in diameter.

Selection of a stone for cast iron is made just as for steel, except that the silicon carbide grit is used.

Next in importance to choice of stones is the surface footage of the part being Superfinished. The effects of this variable are somewhat dependent upon the amplitude and speed of oscillation. It can be seen that the path of a selected point on the working face of the stone is a sine curve, the amplitude of which is the length

of the oscillation stroke, and the length of which depends on the relation between the speed of oscillation and the speed of rotation of the part. These curves seldom trace the same path, rather they continually cross each other forming a "cross hatch." Certain factors, such as inertia, limit practical oscillating speeds; consequently the above described lathe attachments have a fixed oscillation speed and amplitude, and the angle of cross hatch is varied only by changing the surface footage of the part.

As compared to the pattern produced in Superfinishing, that of grinding and turning is in a straight line in the direction of rotation. If the surface footage in Superfinishing is low so the angle of cross hatch is wide, the direction of stock removal is at a considerable angle to the original grinding ridges, and is very efficient. Also, as in grinding, Superfinishing stones act soft and free cutting at low speeds and hard at high speeds. Thus, for both reasons, low surface footage results in rapid stock removal.

After complete removal of the previous finish at this low speed, the Profilometer reading will usually be from 3 to 10 micro-inches. Now, if the speed of rotation of the part be increased, the quality of the finish will be further bettered for at least two reasons. The angle of cross hatch will be lessened, resulting in a new direction of stock removal, and the stone will break down less rapidly, or act harder. After a few seconds at the higher speed, the part will assume a brighter finish of from 1 to 4 micro-inches.

The specific speeds recommended are from 15 to 40 feet per minute for roughing; and 50 to 100 for finishing. While two speeds represent the ideal condition for Superfinishing, it is recognized that it is often advisable, for production reasons, to operate at one speed only; and this is entirely practical, finishes of from 2 to 5 micro-inches being readily obtainable. The surface footages for one speed operations vary from 45 to 80 feet per minute.

The stone lubricant has two purposes. First, to wash away abraded particles of stone and metal. Second, by variation

of its viscosity to control the cutting action of the stone. The higher the viscosity, the better will be the finish; but the rate of stock removal will be correspondingly lowered. A mixture of kerosene and International Compound No. 155 has proven to be a cheap and efficient stone lubricant. The mixture will vary from 10 to 20% of the compound, the higher percentage having the higher viscosity. If kerosene is objectionable, any light thread grinding oil may be used undiluted. The lubricant should be applied to the surface of the work just above the stone as copiously as possible without resulting in splashing.

A radical difference, aside from the low speeds employed, is the pressure involved as compared to grinding. In Superfinishing, it is seldom over 20 lbs. per square inch of the working area of the stone. Naturally, the higher the spring pressure, the faster will be the rate of stock removal. And the lower the pressure, the better will be the finish. Recommended pressures in the operation of lathe attachments vary from 2 to 15 lbs. per square inch, and this variation may be obtained by adjustment of a screw incorporated in the machine for that purpose.

The length of a part which may be Superfinished without traverse of the stone lengthwise of the part depends somewhat upon the diameter. It is not usually advisable to attempt the Superfinishing of parts less than  $1\frac{1}{2}$ " in diameter over a length of more than 2" without traverse. This length will increase with an increase in diameter up to perhaps  $3\frac{1}{2}$ ". Where traverse is necessary, it can be at a rate somewhat in excess of turning feeds.  $1/16$ " to  $\frac{3}{8}$ " feed is recommended depending upon the diameter.

The quality of finish prior to the Superfinishing operation has a very definite bearing on the selection of stones and the other variable conditions. If a production machine is set up to a definite time cycle, it is unreasonable to expect the same results on a crank ground to 50 micro-inches and on one ground to 15 micro-inches. It has been pointed out that every variable condition conducive to rapid stock removal

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also results in a higher Profilometer reading. A stone, for instance, soft enough to remove considerable stock cannot be expected to produce the quality of finish given by one somewhat harder.

While the lathe attachments and general purpose machines are capable of removing a turned finish where time is available, there are few jobs where the time element is not of importance. In their use, as well as special production machines, the better the prior finish, the quicker the Superfinishing operation will be performed, and the better will be the results.

### Experiences in Sample Finishing

The question of what constitutes a good finish as a base for Superfinish, brings to mind, the varied types encountered in the hundreds of sample parts submitted for trial Superfinish from all over the world. It has been surprising, indeed, to see the variation in what has been presented as a good ground finish; and to find the defects not apparent to the eye, and not detected by inspection with the Profilometer.

A short application of the Superfinishing stone shows up such defects as chatter marks  $1/16$ " to  $3/8$ " apart, also feed marks of various depths spiraling around the work from  $1/16$ " to several inches apart. Further application may show grinding cracks ranging from single ones to patches of "grinding craze" several square inches in extent, hardening soft spots, and, perhaps worst of all, parts annealed in grinding up to a thousandth and more in depth. Such an annealed condition is immediately made apparent to one experienced in Superfinishing, as the soft bond stone chosen with the expectation of working on a truly hard surface will cut far more rapidly, and with a rougher, grayer finish than anticipated.

Peculiarly enough, aviation engine parts have shown at least as much annealing in grinding as those of any other class of manufacture. Yet, this is reasonable, because, in an attempt to produce an ultra fine finish, a very fine grit wheel is used with small cutting capacity, and with generation

of more than the normal amount of heat. Many such parts have been received which were annealed to a depth of a thousandth, rendering them really unfit for use. It would seem that a freer cutting wheel, leaving a finish of about 10 to 15 micro-inches, followed by Superfinishing to  $1\frac{1}{2}$  or 2 micro-inches would leave them much more serviceable.

Some of these defects can be removed by Superfinish. Chatter marks are readily erased, feed marks usually with somewhat more difficulty. Sometimes the latter are so deep that their removal results in an undersize part, and the same is true, of course, in removing an annealed skin. So it is evident that the amount of stock removed in Superfinishing is entirely dependent on the previous finish.

Where no serious defects are present, and the Profilometer reading is no more than 15 micro-inches, the stock removal will be no more than one tenth of a thousandth. The average ground job of 20 to 30 micro-inches will show a loss of 1 to 3 tenths, while a turned

piece of work may require from  $\frac{1}{2}$  to 2 thousandths to clean up.

The ridged condition of a bearing after "sanding" has been mentioned before. This sort of surface is very pleasing to the eye, and even has a fair Profilometer reading. However, two seconds application of a Superfinishing stone will usually expose these ridges. There is much to be said in favor of rigid abrasive stones as compared to flexible strip or loose abrasives. Their rigidity insures a duplication of true shape.

This recital of the defects of our common finishes, and they are almost always present, paints a rather dismal picture of what we have been using. However, I believe that great improvement in these conditions will be accomplished as these deficiencies become more generally known; and that, through better preparatory methods, together with Superfinish, we shall produce parts which will assemble into mechanisms with smaller clearances maintained over much longer periods of time.



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### Wells Develops New Metal Cutting Band Saws

A new No. 9 upright metal and wood cutting band saw is the latest offering of The Wells Mfg. Corp., Three Rivers, Mich.

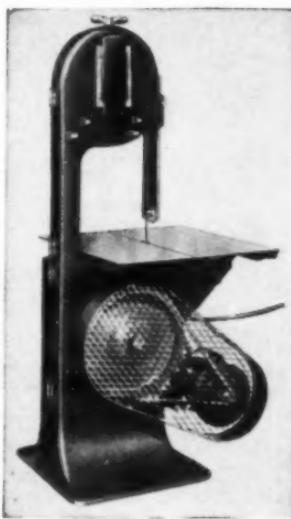
This all around handy saw features four speeds — 60, 90, 250 and 500 r.p.m., covering general foundry, diemaking, patternmaking and sheet metal working requirements from tough metal to sheet metal and wood.

Grease-sealed New Departure bearings are used throughout.

Reduction gears comprise one cast iron and one non-metallic helical gear, running in oil.

Wheels are of cast iron, designed for narrow blades for contour work, as well as the regular  $1\frac{1}{2}$ " wood or metal blades.

The 26" x 28" table is of heavy metal plate, bolted through structural steel bars to base. Throat size is  $11\frac{3}{4}$ " x  $15\frac{1}{2}$ " height.



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# SOLVING Inspection Problems By PROJECTION

(The first article in a series of three on Projection Inspection.)

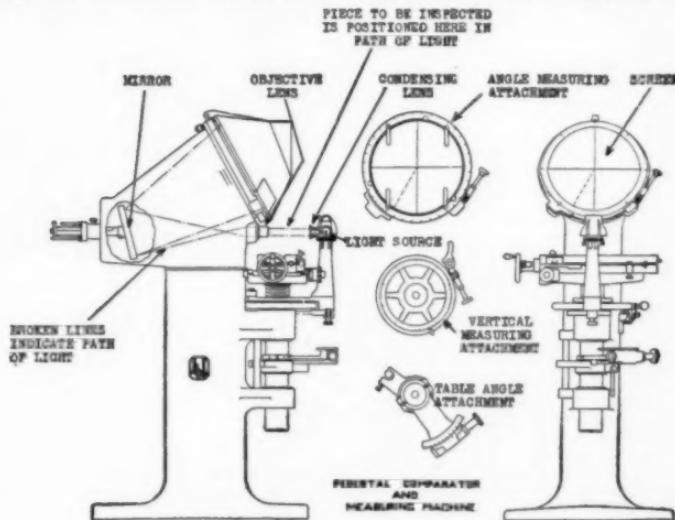
By John W. King,  
Jones & Lamson Machine Co.

PROJECTION inspection is receiving ever widening acceptance because its use solves many inspection problems which are difficult or impractical to handle by other means. Figure 1 shows the principle parts of a projection comparator and measuring machine. The part to be inspected is placed in front of the objective, in the path of the light beam, so an enlarged outline of the piece or portion of the piece being inspected is cast upon the screen. This enlarged outline may be from 10 times to 100 times the actual size of the piece, depending upon the magnifying power of the lens system. Often maximum and minimum outlines of the part to be inspected are drawn on the screen, at the magnification used. Then it can be seen at once, whether or not a given piece falls within acceptable tolerance. (Projection

inspection is a precision method for measuring both angles and dimensions. Dimensions so determined are accurate to 1/10,000 inch).

A typical difficult inspection with mechanical gages is inspecting the lead and form of round top and bottom buttress threads, such as used on airplane cylinders. Accurate inspection of such threads with mechanical gages would test the ingenuity of experienced inspectors. Yet with projection, an inexperienced operator can tell quickly and accurately if the thread form and lead are correct, however unusual may be the thread form. (See Figures 2 and 3).

The accurate inspection of forming tools by means other than projection is often time-consuming and costly; especially if the tool inspected has radii,



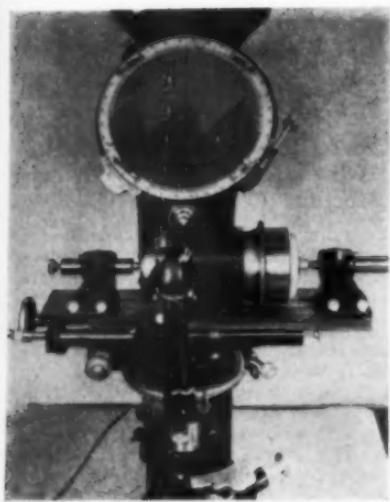


Fig. 2—Closeup of a Comparator set-up for inspecting buttress threads on airplane cylinders.

or complicated contours. But projection requires merely positioning the forming tool on the comparator work table, in front of the lens. Whether the tool is acceptable may then be de-

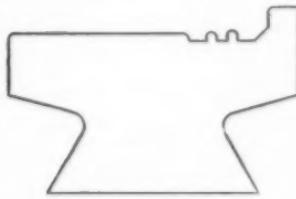


Fig. 4—One of many form tools which are difficult to measure mechanically. To inspect this tool with an inspection Comparator and measuring machine, only a simple chart with right angle lines and a series of radii is necessary, in addition to the Comparator. This principle is used in measuring form tools, profile gages and for general contour inspection. When it is desired to measure several tools, gages or production parts of duplicate shape, the contours may be compared against an enlarged master outline, as mentioned in the case of buttress threads on airplane cylinders.



Fig. 3—Line drawing of the chart used in the Comparator for inspecting the buttress threads on the airplane cylinder shown in Fig. 2. Charts are drawn with ordinary drawing ink on celluloid or tracing paper. (Pencil is sometimes used and some charts are made by etching lines on glass screens). Ordinarily only a few minutes are required to draw a typical chart. Drawing charts for accurate inspection work does not call for unusual skill on the part of the draftsman, because at 100 magnifications, for example, 1/1000th inch on the work shows as 1/10th inch on the screen. Therefore, if the chart is accurate to 1/100th of an inch, the chart can be used to measure parts to an accuracy of 1/10000 of an inch. (Broken lines are used in drawing charts so the operator can tell just where the outline shadow of a piece falls.

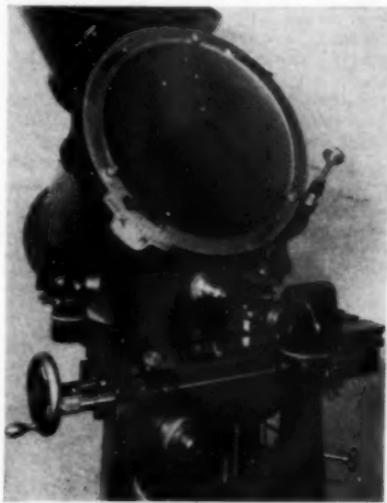
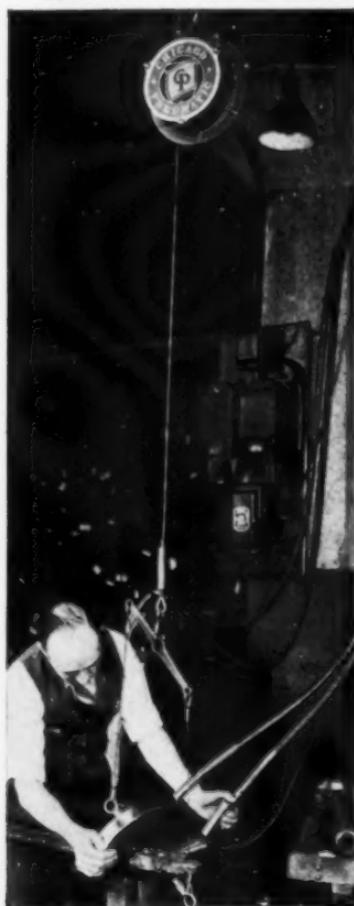


Fig. 5—Setup for inspecting diamond tools.

termined by comparing the shadow with an outline of the tool drawn on the screen; or the dimensions may be measured directly without an outline on the screen; using only right angle lines and a series of radii drawn on the screen. (See Figure 4). Projection is especially valuable for inspecting cutting tools with accurate radii, as

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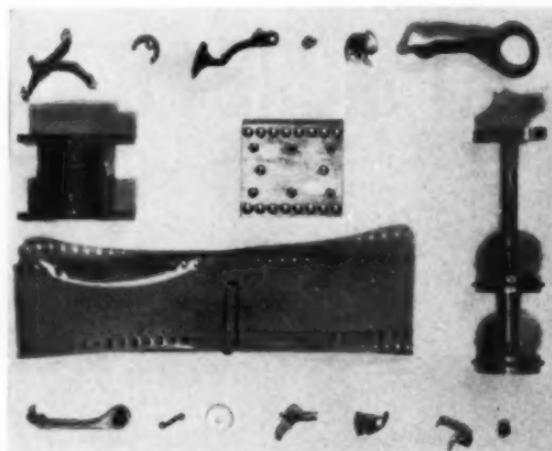


Fig. 6—Movie film, punch and die and camera parts, all of which are inspected by projection. The punch is at the left, just above the center of the illustration.

on many carbide and diamond tools. Such radii are easily and accurately measured by comparing their enlarged outlines with true radii drawn on the screen to the desired magnification. (See Figure 5).

Many punches and dies are now inspected by projection which formerly took hours of tedious inspection. Typical punches and dies inspected by projection are used in movie film manufacture. (See Figure 6). These punches and dies must be very accurate. The punch is inspected by reflection; that is the reflected image of the punch

face is cast on the screen for measurement. This reflection feature is used widely for inspecting type faces as well as all sorts of punches. The method has many unique applications, such as inspecting split neck ring molds for manufacturing fruit jars and bottles. (More about inspecting reflected surfaces will be given in the next article of this series). The die used in conjunction with the punch is inspected in the more usual manner by projecting directly an enlarged outline onto the screen. The shapes of the punch faces and die holes are measured by com-



Fig. 7—Neck ring molds and other parts used in the manufacture of glass products. Also some of the finished glassware, all of which are inspected by projection.

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At the Ward Leonard Electric plant in Mount Vernon, N. Y., brass plate stock 1/16" thick is stacked in lots of 5 to 20 pieces, depending upon the job, and sawed on the DoAll. These 5 pieces 36" long were sawed in 5 minutes, or 1 minute each. Former time, 30 minutes each.



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paring their shadows with master outlines. The distance between the die holes and the distances between the punch faces are measured directly.

Often for sales or engineering purposes, it is highly advantageous to have definite records of the accuracy or inaccuracy of given pieces. Such records, of pieces within the range of the machine, are obtained easily by using a photo plate holder which clamps over the projection screen. These photographs show the pieces at the exact scale of the magnifying power of the projection machine. (See Figure 8).

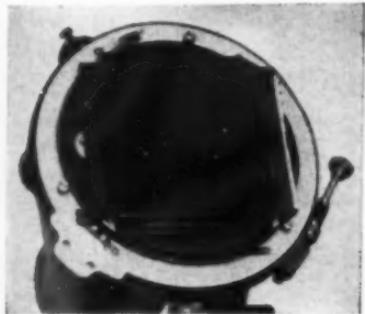


Fig. 8—Adapter with photo plate holder placed over Comparator screen for making photographic records.

The accurate inspection of internal threads is difficult ordinarily. But with projection, it is a matter of making a cast of sulphur and graphite. The molten material is poured into an adapter held against the threads of the portion to be measured. When the cast has hardened, the adapter holding the cast is placed on the comparator to measure the thread form, lead, etc. For the manufacture of accurate internal threads on a production basis, the tap, thread mill, or the form produced by the grinding wheel, should be inspected first by projection to see if the form of the tool is correct. In the case of taps and gages, the lead should also be inspected. Then the first threaded part produced should be inspected with a sulphur cast to make sure that both the form and lead are correct. After a

satisfactory set-up has been made, all the inspection necessary is the inspection of an occasional piece, thereby checking the set-up and amount of tool wear.

The foregoing examples were chosen as typical of the hundreds of projection installations in tool shops and machine shops. Even so it is interesting to mention that each of the large industries including the automobile, airplane, electrical, textile, etc., also have hundreds of projection inspection installations. Many smaller industries find it highly profitable to have sizeable numbers of projection comparators. In conclusion it can be noted that projection inspection continues to be used in more and new fields everyday because each difficult inspection job solved by projection suggests opportunities for inspection and production savings on other products. The next article in this series will describe several unusual applications of projection inspection.

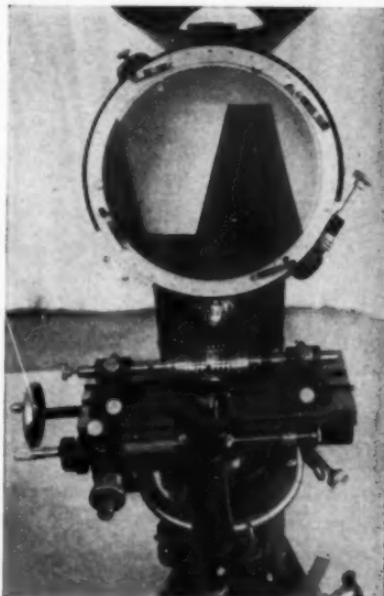


Fig. 9—Setup for inspecting thread worm.



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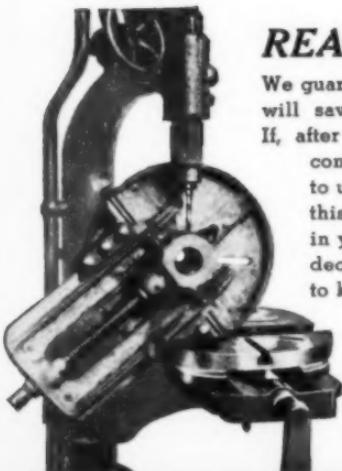
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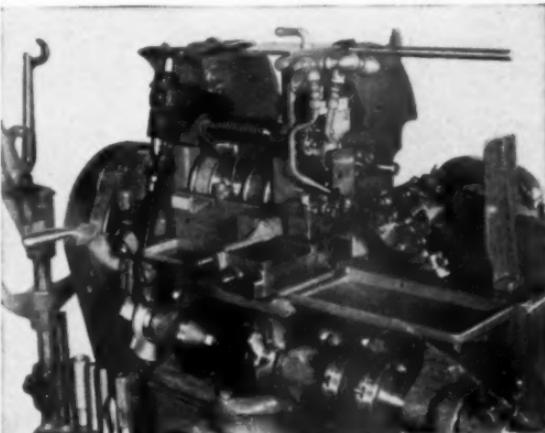
#### Attachment Line

Several new items have been added recently to the Brown & Sharpe line of automatic screw machine attachments. Of these, the new longitudinal turning attachment is intended for the Nos. 00 and 00G automatic screw, turret forming, cutting-off and screw threading machines (high speed). The illustrations show the attachment on a model 00G and a closeup of the tool slide assembly.

This is essentially a vertical slide attachment provided with longitudinal movement. In addition to performing any vertical slide operation, it will also do straight turning to 1" in length. It is particularly useful turning behind a shoulder in that it eliminates the need of a swing tool. Turning is accomplished independently of other operations and with the spindle running in either direction. Since the attachment is rigidly mounted and of sturdy construction, comparatively rapid turning is permissible.

The vertical and longitudinal movements are both actuated by cams on the cam shaft of the machine. Each cam moves a bell crank, link and rack. The vertical movement rack turns a shaft which operates a pinion and rack in the tool slide to produce vertical movements of the slide. The other

rack mechanism imparts longitudinal movement to a sleeve on the vertical movement shaft and thus to the tool

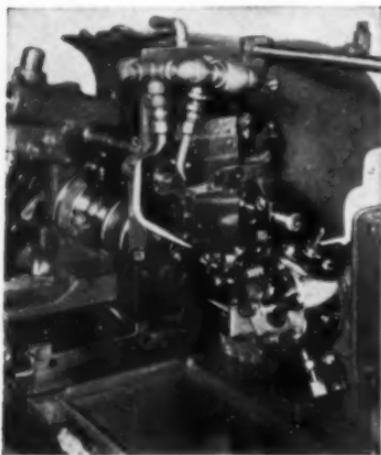


slide assembly, attached to the end of the sleeve. A spring acting on the rear of the vertical movement bell crank and another acting on the longitudinal movement sleeve keep rollers on both bell cranks in contact with the cams. Turning tool blade, tool wedge and two cam blanks are furnished with the attachment.

Motor drives for drill spindles of cross drilling attachments are also available for Nos. 00G, 0G and 2G automatic screw machines (high speed).

Motor drives are also offered for turret drilling attachments on the same models. This equipment includes everything necessary to drive by motor, the drill spindle assemblies of the turret drilling attachments.

Still another attachment provides for motor drive of the cross drilling and turret drilling attachments by the same motor. This arrangement combines the functions of two drives already mentioned.



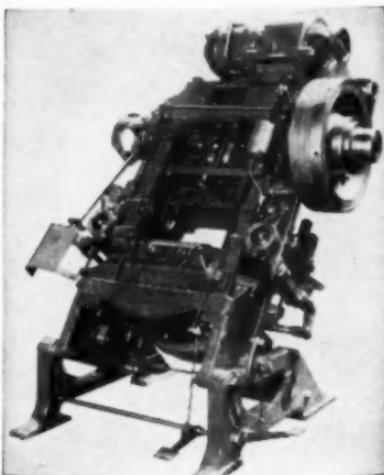
Full details are given in bulletins 1091.5 and 1092 which may be obtained by addressing Brown & Sharpe Mfg. Co., Providence, R. I.

### Bliss No. 645 High Production Press

The E. W. Bliss Co., 53rd St. and 2nd Avenue, Brooklyn, N. Y., announces that inclinable mountings are now available for their No. 645 series of "Bliss" high production presses. This is a special feature which allows the machine to be operated in any one of three optional positions. The square pockets in the legs of the press support the machine. The makers emphasize that this is a very practical feature, inasmuch as the press can be used for work which is blanked through the dies and bed while the press is in an upright position. It can also be used for work that is either ejected by the bar knockout or returned to the surface and discharged

by gravity while the press is inclined. Adjustable cam knockouts are also available.

The press is equipped with precision type bronze lined gibbing which is adjustable to .0005", bronze ball seats for the connections and bronze bushed main bearings with automatic force feed lubrication. The Bliss high speed rolling key clutch with its auxiliary fittings and compactness of all moving



parts, assures speedy action of these presses. The precision type feed with hardened gearing, hardened rollers and pins is also available. Bolster and clamping cap are so designed that the dies are easily set and tried out without returning the press to the vertical position. Operating speed of the press is under control of a variable speed drive unit that adapts the machine easily to a wide range of work. In this case, the operating speed is from 100 to 300 strokes per minute. The press shown is designed for 65 tons.

### Norton Presents a New 10" Type C Line

While bearing the same type designation as the earlier model, a number of refinements are incorporated in the



new line of 10" cylindrical grinders announced by Norton Co., Worcester, Mass. The most outstanding change has been in general appearance, a feature that necessitated a completely new base. Provision has been made for suspending oil and coolant pumps vertically on springs so that the pumps now run submerged. Oil and coolant reservoirs are an integral part of base. At rear of base is a large, cored receptacle in which all the motor starting equipment is mounted, isolating it completely from dust or moisture.

Wheelside and table ways are pressure-lubricated from a separate system thus permitting the use of oils of different viscosities for strictly lubricating purposes and as the hydraulic fluid for operation of the various units so controlled.

Vee belts and a silent chain running in oil drive the headstock which has been redesigned. Likewise the footstock has been changed. Large spindles and centers assure more rigid support and contribute to the betterment of the surface finishes produced.

Type C machines are available with hand, hydraulic or mechanical traverse of the table. A semiautomatic model is also built which can be arranged for either hand or hydraulic table traverse. In addition, semiautomatic machines are usually equipped with hydraulically

operated footstock and headstock. Often a hydraulically operated steadyrest is also supplied. It is a plunge-cut machine and parts are ground with the operator simply placing the work between the centers and moving a single lever which initiates the following functions:

1. Work centers close
2. Wheel slide advances rapidly.
3. Work rotation begins.
4. Rapid advance of wheel is decelerated to grinding feed.
5. Wheel feed arrested by a positive stop and wheel dwells for final finish and size.
6. Wheel slide retracts rapidly.
7. Work rotation stops.

Operation of the lever withdraws footstock center and operator removes work from machine. Because of its automatic features, frequently one man can operate two machines resulting in very high production.

Semiautomatic machines can also be arranged for manual control. In this case the operator places a dial gauge on the work and from it observes when correct size is obtained. Moving the lever then withdraws the wheel slide rapidly and the gauge is lifted from the work which is released by a further movement of the lever.

Machines can be converted from manual to automatic control merely by turning a convenient switch on the front.

## Geometric Develops Additional Precision Threading Machines

Two new models of precision threading machines, the Nos. 16 and 11, supplement the No. 14 which was announced by Geometric Tool Co., New Haven, Conn., last year.

These machines are intended for the threading of duplicate parts where precision and quantity production are paramount considerations.

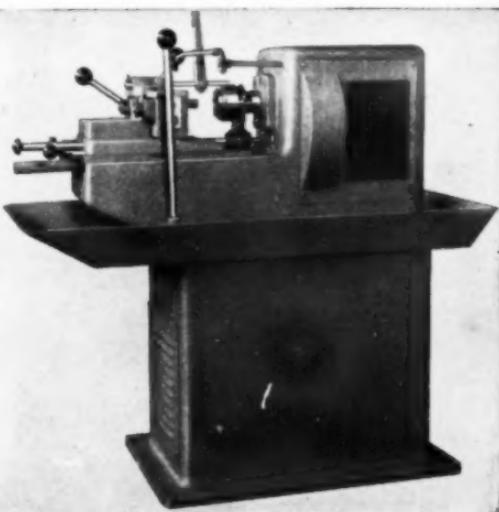
The No. 16 illustrated, will cut threads up to 1" diameter in National Coarse Thread Series, and sizes up to 1½" in fine pitch threads.

The No. 11 is a bench model and although intended primarily for small diameter, fine pitch threads up to 5/16" diameter, may be used on finer pitches up to 9/16" diameter.

A unique feature is the flexibility offered in the way of work holding devices. Machines may be purchased with merely the machine platen and the user can make his own work holder. Or they can be supplied with a standard two-jaw vise or with a standard holding device. Special work holders can also be made up on special order.

Either the style KD Geometric rotary die head with milled or tapped chasers or the style TR Geometric ro-

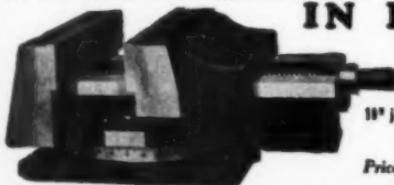
tary die head employing tangent or circular chasers may be furnished at the purchaser's option.



An ingenious and effective method maintains vertical and horizontal alignment. Opposed adjusting screws with an unusual pivoting arrangement of the carriage enable the user to keep the work holder in accurate alignment with the die spindle at all times.

The many new and interesting features are fully covered in a new 12-page bulletin. There are numerous large size detail photos, drawings and specifications which leave little untold.

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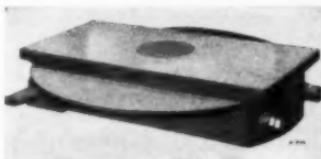
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Tool Grinders - Drilling and Centering Machines  
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## Rusnok Motor-Driven Milling Attachment

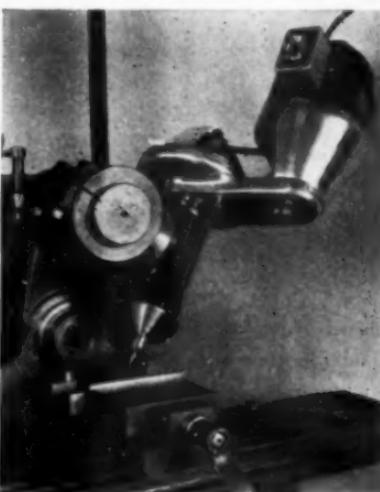
A new all-duty, high-speed motor-driven milling attachment has been perfected by Rusnok Tool Works, Chicago. It will be marketed by Lockwin & Co., 205 West Wacker Drive, Chicago, Ill.

The attachment is designed to convert a horizontal milling machine into a universal milling machine. It fits all round overarm milling machines and operates at any angle. Can be set easily for single or compound angle milling.

The spindle is mounted on 3" Timken precision roller bearings and is designed for a No. 9 B & S taper shank holder for end mills or taper shank end mills of the drawbar style. End mills of smaller sizes of the straight shank type can be used in the holders. But two sizes of holders are needed to handle the complete range of end mill sizes from  $1/16$  to  $3/4$ ".

A positive action thermostatic switch is provided on the  $1/2$  h.p. motor.

This versatile attachment has many useful applications in general manufacturing, mould and die making, tool room and pattern making and in the construction of special tools, jigs and



## NO INCREASE IN PRICE

of

CARBOLOY

DIAMOND DRESSERS

For Dressing All Grinding Wheels

Write for Catalog DR-38

CARBOLOY COMPANY, INC.

11139 E. 8 Mile Road, Detroit, Mich.  
Chi.-Clev.-Newark-Phila.-Pitts.-Worchester, Mass.

fixtures. It should also be useful for recessing operations on tool shanks in preparation for Tungsten Carbide tips, surfacing, keyslotting and a wide range of jobs with end mills, small angle cutters, slitting saws, etc.

An attractive four page bulletin will be sent on request.

## Transfer Screws in SAE Sizes

Due to growing demand for S. A. E. sizes in transfer screws, Nielsen Tool & Die Co., 1859 Gardner Ave., Berkeley, Mich., are now tooled up to produce these along with U. S. S. sizes.

These transfer screws facilitate the transferring of blind screw holes in dies and to a great extent eliminate chance of errors, as the centers and drill circles are sunk into the steel from .010 to .015".

The makers will gladly send full details.



# Conway

## Clutch Sheaves

Here's another popular application of the versatile Conway Clutch—for modern multi-V-belt drives.

In this, as well as the numerous other industrial applications, Conway Clutches are in step with the trend in modern machinery toward higher speeds and lighter weight.

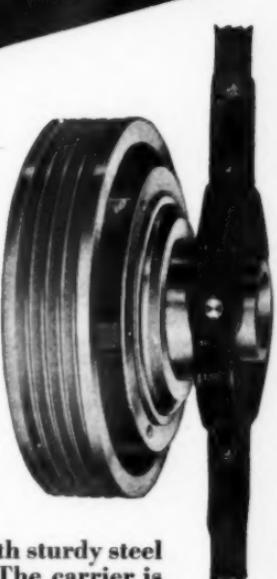
Conway meets the new stress factors with sturdy steel plates that withstand sudden torques. The carrier is rugged and the husky actuating levers are pivoted to the rigid clutch carrier, in contrast to the practice of attaching levers to flimsy floating rings.

Centrifugal force, the traditional enemy of clutch performance, is utilized in the Conway to aid release and insure against drag. When the shifting cone is withdrawn to disengage the clutch, centrifugal force pulls out and holds out the levers, thus keeping the plates apart.

Safety and neatness are achieved by enclosing the parts usually dangerously exposed in other makes. All of the good, proved features of old type clutches have been modernized and retained.

Conway Clutches are conservatively rated—and we offer them to you as *the last word in friction clutches*.

*Have you Conway bulletins P-24, L-28 and XYZ-L on Disc Clutches, S-10—Overload Release and Slip Clutches,—No. 36-A Compression Clutches—K-32—One Revolution Clutches, E-8—Expansion Clutches?*



THE CONWAY CLUTCH CO.

1541 QUEEN CITY AVE.

CINCINNATI, OHIO

## Displaying "Budgit" Portable Hoists

This unique display is used at trade conventions and exhibitions to focus attention on "Budgit" portable hoists—and to emphasize that they may be plugged into any handy lamp socket.

Of more than passing interest from a design standpoint is the fact that the display stand is built up of steel bars and plates, fabricated into a one-piece unit by the ShaWeld process—a new method of fabrication employing flame cutting and arc welding.

The hoists are available in 250, 500, 1000 and 2000 lbs. lifting capacity, with speeds to suit today's tempo. To use, all that's necessary is to hang up, plug in and let the hoist do all the work.

A new catalog gives the whole story and a "Time Savings Calculator" shows the savings "Budgit" hoists earn. Address the Shaw-Box Crane & Hoist



Div., Manning, Maxwell & Moore, Inc.,  
435 Broadway, Muskegon, Mich.

## ABRASIVE WHEEL DRESSERS



KEEP GRINDING WHEELS SHARP  
AT LOW COST. SPECIAL DRESSER  
FOR SURFACE GRINDER GIVES  
HEAVIER CUT WITHOUT BURNING.

SEND FOR CIRCULAR

**M & S DRESSER**  
377 CORNWALL ST.,  
HARTFORD, CONN.

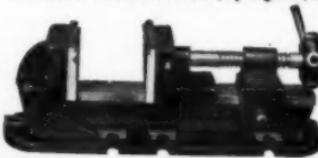
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**V  
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## "For The Tough Jobs"

Our circular shows 6 different sizes and types of GEM VISES for Drill Press, Mill, Planer and Grinder work.

J.E. Martin Tool & Die Works, Springfield, O.



**GRIND THE  
EASTERN CENTERLESS WAY**  
**ACCURACY-FINE FINISHES-LOW COST**  
Large or Small Lots

**EASTERN CENTERLESS GRINDING CO.**  
624 Capitol Ave., Hartford, Conn.

*Mall*  
TRADE MARK

# PNEUMATIC SANDING DRUMS



**MALL Pneumatic sanding drum—size 3 $\frac{1}{2}$  x 6"**

The wide-spread use of this air-cushioned metal finishing wheel is convincing proof of its efficient and economical performance. It holds the abrasive firmly in place to provide a clean, even cutting action—free from chatter.

It leaves a fine draw file surface on all metals and other materials in a minimum of time and with minimum effort. Its universal application to all models of flexible shaft machines eliminates the need for special equipment.

The low cost of this all-purpose finishing tool is quickly absorbed in savings on time, labor and abrasives. Arrange TODAY to incorporate this MALL Pneumatic Sanding Drum into your production program.

Complete information will be furnished on this tool and MALL flexible shaft grinders without obligation.

**ADD EFFICIENCY  
AND ECONOMY  
TO ALL  
INDUSTRIAL  
FINISHING**



**MALL pneumatic sanding drum in use on a MALL flexible shaft grinder.**

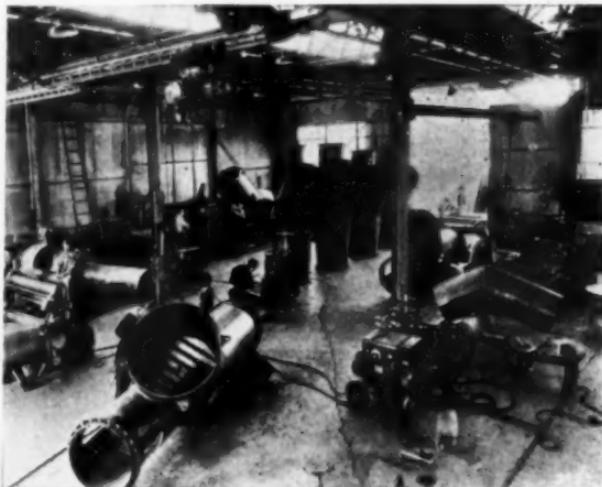
**MALL TOOL COMPANY**  
7742 SOUTH CHICAGO AVENUE CHICAGO, ILLINOIS

## Hobart Welders Help Pump Construction

A large pump order recently completed by the Pomona Pump Co., of Pomona, Calif., consists of 16 huge Mixflor vertical pumps for the Contra Costa high line canal, a part of the great Central Valley Water Project.

These 16 pumps are used as canal lifts and were installed in four pumping stations, 4 pumps in each station, successively lifting over five million gallons of water per hour through four lifts varying from 25 to 50 feet in height,

and with a total connected load of 3800 h.p.



## Precision Collet Chuck

**NO VIBRATION** means longer drill and end-mill life. Our 8-point collet grip gives perfect centering, and allows short drill-projection, by gripping equally well on shank or flutes.



*Pat. Pending*

For Fewer Breakages—Use "Erickson"

**ERICKSON STEEL CO.**

East 80th & Bessemer,  
Cleveland,

Ohio

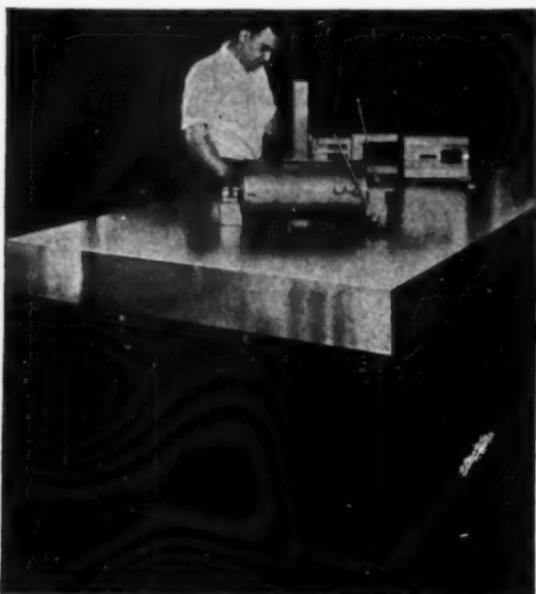
They were completely built and fabricated at the Pomona factory, and weighed a total of 40 tons. Approximately 75% of this weight consisted of the discharge elbows and base mountings which were shaped and fabricated from rolled steel plate and shaped in Pomona Pump Co.'s own modern welding shop.

Through this shop is continually flowing the production of many similar large units—some with individual parts requiring very intricate and accurate placing and welding vanes and supporting hub centers to give correct hydraulic performance.

The Pomona welding shops, a bay of which is shown, are well equipped to turn out these large units efficiently.

Cutting and trimming is done entirely by the oxy-acetylene torch and the welding is almost entirely done by the Hobart with several 200 amp, 250 amp, and 300 amp portable electric arc welding machines. Welding and all general fabrication on these large pump units calls for especially high class workmanship and quality of welds, which on this large job and on all other such

## SAVE TIME ON PRECISION WORK



### ARC-WELDED All-Steel Frame

Optional equipment. Absolutely rigid—has strength of one-piece construction. Provided with 32 lock leveling screws which enable user to level plate quickly and accurately. Screws can be locked securely.

## CHALLENGE Semi-Steel LAYOUT SURFACE PLATES

Wherever a true, rigid, smooth surface is required for assembly and inspection, Challenge Semi-Steel Layout Surface Plates are highly recommended. They are made of the finest grade iron and steel and planed perfectly smooth and square. Their use in many leading industrial plants has accounted for pronounced savings in time. Challenge Layout Surface Plates are furnished in one standard size, 48x96 inches, with or without steel stand; special sizes on order. Mail coupon for free catalog and price list today!

**THE CHALLENGE MACHINERY CO. • GRAND HAVEN, MICH.**

CHICAGO, 17-19 E. Hubbard St.



200 Hudson Street, NEW YORK



**FREE CATALOG**—Illustrates and describes Challenge Time- and Labor-Saving Devices for Tool and Machine Industries.

Name

Full Address

jobs must pass rigid government inspection by Reclamation and U. S. Navy engineers.

The technique calls for welding mild steel and Corten steel plates and shapes varying from  $\frac{1}{4}$ " to  $1\frac{1}{4}$ " in thickness, and all types of welds and in all positions. Steel fabrication in large pump units is becoming very popular with reclamation engineers and is rapidly supplanting the cast iron construction of other days.

**ALL ALLOY PORTABLE SHEARS**  
FULLY GUARANTEED



Two Sizes

No. 1 cuts up to No. 11 gauge strip or sheet.  
No. 2 cuts up to  $\frac{1}{4}$ " steel plate.  
Special Blades for shearing stainless steel.

**BREMIL MFG. CO.**  
1720 Pittsburgh Ave., Erie, Pa.

## Washer Firm Publishes New Stock List

The Wrought Washer Mfg. Co., Milwaukee, Wis., important producers of washers, expansion plugs, stampings, tools and dies, serving many industries, has announced the publication of a new stock list—No. 55-C—available to manufacturers upon request.

This new publication lists thousands of washer specifications in various materials, including steel, brass, copper, aluminum, fibre, etc. carried in actual inventory available for immediate shipment. Those sizes permanently maintained in stock are so designated, thus enabling manufacturers to select for standard production as well as new assemblies the particular sizes on which they can always obtain prompt delivery.



**GRANT RIVETERS**



include both Noiseless Spinning and Vibrating Hammer types of machines — also Vertical and Horizontal Multiple Spindle Spinning Machines.

You're invited to send unriveted samples for recommendations and quotations—**NOW**.

**THE GRANT MFG. & MACHINE CO.**  
C. E. Station  
BRIDGEPORT, CONN.

## Nozzles for Oxy-Acetylene Gouging

A series of new oxy-acetylene gouging nozzles, for use with a standard

**CARROLL Universal Dividing Heads**

22 Years of Popularity. 6",  $10\frac{1}{2}$ ", 12" Swing, Right or Left Hand Type.



Rigid, Accurate, Long-Life.

**WM. CARROLL & SON**  
1776 Lexington Ave., (Norwood) Cincinnati, Ohio

# ERRINGTON MECHANICAL LABORATORY

MAIN OFFICE AND WORKS: STATEN ISLAND, NEW YORK

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830 OLD SOUTH BLDG.

## CLUTCH OR CONE DRIVE

*Our High Speed Tappers  
are Super-Sensitive for  
Small Tapping*



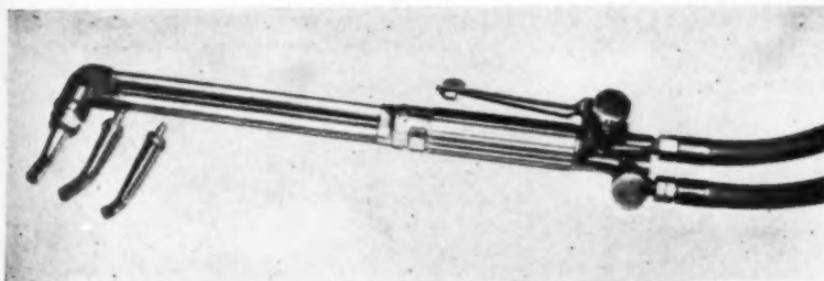
## NEW ROCKFORD PRESSES

*Built for exceptional  
SERVICE*

Engineered for super performance and long life, you'll find in the New Rockford Presses, every modern advance—Chrome Nickel Crankshaft, Hard Bronze Bushings, Timken Bearing Back Shaft, to mention just a few.

There's a model for every requirement—and all are backed by more than 30-years' experience in press building. *May we tell you more—and send a copy of our complete catalog?*

**ROCKFORD IRON WORKS**  
ROCKFORD — ILLINOIS



hand-cutting blowpipe, such as the Ox-weld C-32 is announced by The Linde Air Products Co. Available in three sizes, the nozzles provide a means for quickly and accurately removing a narrow strip of surface metal from steel plate, forgings, and castings.

The nozzles are designed to deliver a relatively large jet of oxygen at low velocity. By proper manipulation of the blowpipe, a smooth, accurately-defined groove can be cut or gouged out of the surface of the metal. By using various standard size nozzles and man-

ipulations, the groove can be varied in width and depth at the will.

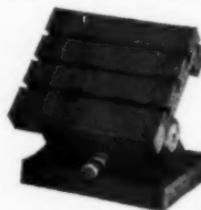
Important uses for these new nozzles are:—gouging the underside of electric welds; removal of weld metal, such as temporary tack-welds and defective welds; preparation of plate edges for welding; and maintenance and scrapping operations. A wide field of miscellaneous uses include gouging in metal-shaping and trimming processes.

Further information about the new Oxweld gouging nozzles can be obtained from the nearest Linde office.



**MODERNIZE** present equipment with a **RUSSELL BORING BAR**. Bores 9/16" to 12" dia. with boring axis parallel to shank axis. One compact tool, with micrometer adjustment.

**RUSSELL BORING BAR CO.**  
MIDDLETOWN, OHIO



### McMAHON

Adjustable Angle  
Plate

For grinding any  
angle accurately.

Two sizes  
Model "A" with T slots  
3½, 3½, ... \$12.

Model "D" with tap hole  
6x7½ ... \$30.

Desirable territory  
open for dealers  
142 JUNE ST.,  
DAYTON, O.

FRANK McMAHON CO.,



## - F A M C O -

ARBOR PRESSES  
FOOT PRESSES

BENCH and FLOOR MODELS

Write for Catalog

**FAMCO MACHINE COMPANY**  
1320 18th St.

Racine, Wis.



### A New Composite Metal

A new composite metal that seems to offer great possibilities from the standpoints of wear, corrosion resistance and low production cost is reported by United Engineering & Foundry Co., Pittsburgh, Pa. They have just been granted a license for the new development by R. E. Kinkead, 3441 Lee Road, Cleveland, Ohio.

The new material is ordinary steel

with the surface alloyed by the addition of chromium and nickel. The machine which makes it possible, utilizes the Lincoln "Electronic Tornado" process of automatic carbon arc welding.

Providing increased wearing qualities at substantial cost savings, the new composite metal is tremendously significant, to the steel industry and to many fields where wear and corrosion resistance are important.

# Eklind

## UNIVERSAL MILLING HEADS

## TURCHAN

## HYDRAULIC DUPLICATING ATTACHMENT



#### THE MODEL 4 H.C. EKLIND

— TURCHAN

Hydraulic Duplicat-

ing Unit shown, is de-

signed and priced for the

average range of work in die

shops making Bakelite, Plastic

Rubber and Drop Forge molds and

dies. Oil pressure is supplied from tank

to feed quill and arm at exact rate to follow

contour of model. Operators can learn quickly

to duplicate within a few thousandths and save

considerable over hand methods.

The "EKLIND" Milling Head is offered separately

and the duplicating attachment can be added later.

Write today for circular

**UNIVERSAL HIGH SPEED TOOL CO.**  
549 W. WASHINGTON BLVD. CHICAGO, ILLINOIS



**Air CYLINDERS and VALVES**

We've been making them for our own machines for 25 years. Exclusive design ...without tie-rods. More compact! Heads removable without disassembling entire unit. All cylinders cast iron, machined and honed. All diameters, lengths and mountings. Hand valves; foot pedal valves; electric operated valves and our own exclusive design automatic self-operating valves. *May we quote you on your requirements?*

The Bell Machine Co. 61 Jackson Dr., Oshkosh, Wis.

## VIMCO puts the Light on the Spot

VIMCO brings the light to the job, focused right where it is needed. This light can be attached to the machine and easily adjusted.



VIMCO will gladly cooperate in solving your lighting problems. No obligation to you.

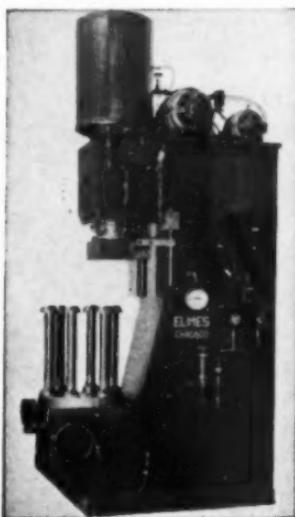
Shown is a Nibbler Machine of The Liberty Machine Co., equipped with a Vimco Light.

*Write today for more details.*

**VIMCO MFG. COMPANY, Inc.**  
108 Chenango Street, Buffalo, New York

## Elmes Metal Marking Press

A versatile new hydraulic metal marking press is announced by the Charles F. Elmes Engineering Works, Chicago. It will die stamp any marking on metal pieces of a wide range of



sizes and shapes and is said to be capable of 20 markings per minute.

The operation is fully automatic and is controlled by push buttons. There are 6 stations on the turn table. The table may be moved independently of the ram and vice versa. However, the machine is arranged so it will not stamp a blank mandrel. The pressure may be released at a pre-determined tonnage or after the die has marked the work to a specified depth.

The range of pressure is controllable from 15 to 100-tons. The machine is of all steel construction and has an overall height of approximately 11 feet. It includes motors, starters and accessories ready for operation and is modern in design and appearance.

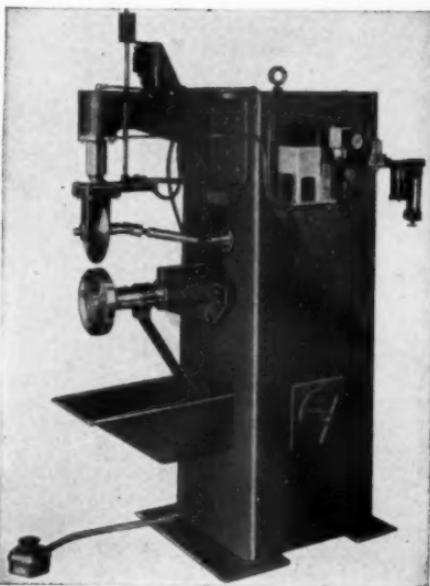
### Acro Presents Seam Welders

The Acro seam welders are designed for straight or circular seam welding, or can be furnished with a universal head. Either wheel, or both wheels, can be driven by power or the knurl method. Speeds can be furnished to suit particular requirements. Current interruption may be complete electronic or mechanical.

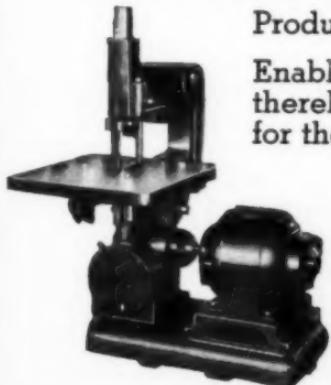
In addition to these two types of interrupters, Acro also offers an Acro electronic interrupter using water-cooled ignition tubes. The on time and the off time are easily adjusted. Cooling of the wheels is accomplished either by the use of hollow wheels or the spray method. The air control for actuating the upper wheel and starting the interrupter is fully automatic. Pressure is also adjustable.

Acro units are available in all sizes with various throat depths.

Address Acro Welder Mfg. Co., 1570 So. First St., Milwaukee, Wis. for full details.



## Oliver Die Making Machines Will Save You Money—



Produce your rush jobs on time—  
Enable you to use less skilled labor,  
thereby reserving the A-1 Mechanics  
for the exacting work.

*They are fast and efficient  
on all sawing, filing and  
lapping operations.*

Send for catalog and prices—  
no obligation.  
Prices as low as \$125.00.

**Oliver Instrument Co.,**

1408 Maumee St.  
Adrian, Mich.

### A Turret Lathe in Miniature

A miniature Warner & Swasey turret lathe that is an exact replica in every detail of a full size machine, including turrets that actually index, a head stock with a complete range of adjustable speeds, and a miniature oil pump that actually circulates coolant liquid, stole the show when employees exhibited their hobbies at the Warner & Swasey open house last week.

The work of Paul H. Klamm, a planer department foreman who has been building models as a hobby for sev-



### Drill Grinding Attachment

fits Black & Decker and Van Dorn grinders, sharpens twist drills correctly. Price only \$18.

C. H. Carlson Mfg. Co.  
13-15 Main St., N. E.  
Minneapolis, Minn.

Write for  
bulletin

5

eral years, the miniature lathe is complete in every detail. It has way covers, a square turret lock bolt with remote control, rapid traverse, adjustable turning heads on the hexagon turret, even a tiny stop roll with adjustable stop screws — and everything works. Not much more than 20 inches in overall length, the machine has gears in the apron feeds as small as  $\frac{1}{4}$ -inch in diameter.

Spurred by the remembrance of some very unusual models exhibited by his fellow employees at the company's open house last year, Klamm averaged

### HARD USAGE Doesn't Faze The HARTFORD MILLING VISE



We also Build Machinery on a Contract Basis,  
Design and Develop Special Automatic Ma-  
chinery—Gears and Gams Cut to Order.

Because it was designed to "take it" — and it does! It will stand up, day after day, under the heaviest, toughest strain of production milling work. Made of the best materials, with all parts interchangeable, it will outlast four or five ordinary vises. Rapid and accurate in operation—the top eccentric handle gives tremendous binding force, while the lower cam-faced handle gives instantaneous quick-opening and return. A trial in your shop will convince you better than anything we might say.

Write for Folder and Complete Details

Jaw width .....	5"	Maximum opening .....	$3\frac{1}{2}$ "
Jaw depth .....	$1\frac{1}{2}$ "	Weight .....	40 lbs.

Also made in the swivel-jaw type with hard  
or soft jaws, maximum opening  $2\frac{1}{2}$ ".

**HARTFORD SPECIAL MCHY. CO.**  
285 HOMESTEAD AVE., HARTFORD, CONN.



## USEFUL In Any Modern Shop

This sturdy 36"x48" Milwaukee Surface Plate is of semi-steel construction, accurately machined, provided with cross ribs every 10½" for rigidity, securely mounted on cast legs which are machined and provided with SAE adjusting screws for perfect alignment. Height from floor to top of plate 30". Shipping weight 1100 lbs.

We also make larger and smaller plates either with planed or scraped surfaces which ever is desired.

*Write today for full information.*

**J. C. BUSCH COMPANY**

ENGINEERS AND MACHINISTS  
SINCE 1907

E. Pittsburgh Ave. and So. Ferry St.,

MILWAUKEE, WIS.



## WITTEK AUTOMATIC ROLL FEEDS

*fast, safe, accurate, automatic*

For profits, economy, safety and automatic high speed punch press production, install WITTEK Automatic Roll Feeds. Can be installed on ANY MAKE OR SIZE PUNCH PRESS WITHOUT ALTERATIONS. Wittek Feeds are preferred because they combine high speed accuracy with low maintenance cost, they save dies, reduce scrap to minimum and make high speed automatic operation practical on even comparatively short runs.

### WITTEK REEL STANDS

6 models—a reel stand for every job—will handle any size coiled stock. No. 3 (illustrated) has automatically expanding coil holder which provides easy loading and assures perfect balance at all positions. Wittek Reel Stands give an even, steady run of stock to the feed, insuring maximum production by eliminating looping, tangling and backlash of stock.



- WITTEK Feeds handle any coiled stock and feed either from right to left, left to right, front to back and back to front in any length from 64" to 24" per press stroke at catalog speed or faster. Single Roll without straightener and compound Types with or without straighteners. Improved and simplified method of operation does away with complicated parts and consequent breakdown factors.

**WITTEK MANUFACTURING CO.**  
4305-9 W. 24th Place, Chicago, Ill.

## CUTS CLEAN

Whether it's a straight, circular or irregular job, the BEVERLY SHEAR gives a clean, sheared edge without knurl or distortion—and with minimum effort.

Made in two sizes, either of which may be carried in a tool box—No. 1 weighs 16½ lbs., and cuts up to 14 gauge.

No. 2 weighs 32 lbs. and cuts up to 10 gauge.

*Reasonably priced—send for descriptive circular*

**THE BEVERLY SHEAR CO.**  
3807 W. 118TH PLACE, CHICAGO, ILL.



4 hours a day at his self-appointed hobby assignment for some 300 days.

Klamm is pictured in the center, showing the model to Wm. J. Burger, Warner & Swasey works manager (left), and Nels Swenson, plant superintendent.

### A New High in Broaches

What is believed to be one of the longest single piece hardened and ground broaches ever produced was recently delivered by Colonial Broach



Headquarters for Standardized Die Sets, embodying many exclusive features and embracing more than 185,000 stock sizes and 46 different styles. A die service that is unsurpassed. Let us prove it!

*Write for our new 288 Page Catalog.*

**E. A. BAUMBACH MFG. CO.**  
1810 So. Kilbourne Ave., CHICAGO, ILL.

Company, Detroit, to a producer of tractors. Designed for complete finishing of splines in a single pass of the broach in tractor drive bevel gears, the broach itself is over 80 inches long and approximately 5 in. in diameter. The broach is to be used on a broaching machine having a 6 ft. working stroke.

### BURR KEYSEATERS



Mill keyways in the run or on the ends of shafting already erected—save money on alteration, erection, and repair work.

Made in 4 sizes, for hand or motor operation.

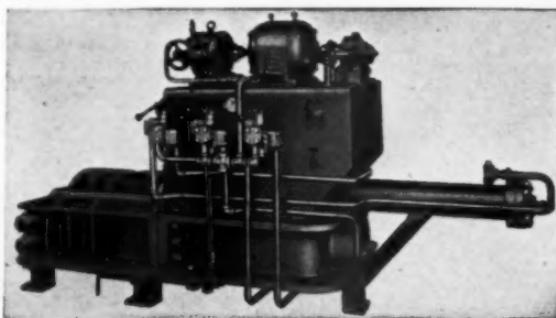
*Write for Bulletins and prices.*

**JOHN T. BURR & SON**  
429 Kent Ave., Brooklyn, N.Y.

### High Density Baling Press

The Hydraulic Press Mfg. Co., Mount Gilead, O., announces a new baling press.

Trimmings, punchings, or similar scrap metal, are placed in the box section of the press. The sliding lid which forms the top of the box, is closed by hydraulic pressure. As soon as the lid is closed, the preliminary pressing platen moves towards the end of the box. When this platen has reached the end of its travel, the side baling platen moves forward, compressing the scrap into the finished bale. The sliding lid is then opened, returning the first platen with it. The side platen is also returned to its initial starting position. The finished bale of exceptionally high density is then ejected from the box by a pneumatically operated ejector located



ed underneath the box.

The baler requires a minimum of space. There are no outside hydraulic pressure lines to be connected. The press is complete with electric motor and hydraulic pumps. To put the machine in operation, it is only necessary to connect electricity for motor, compressed air for ejector, and water for cooling the operating oil.



**STYLE 10-B GRAND RAPIDS  
COMBINATION TAP & DRILL GRINDER**  
SHARPENS TAPS FROM NO. 6 TO 1½"  
TWIST DRILLS FROM ½ to 1½".

BULLETIN ON REQUEST

**Gallmeyer & Livingston Co.**  
405 STRAIGHT AVE., S. W.,  
GRAND RAPIDS, MICH.

Standard Since 1911



INCLINABLE  
POWER  
PRESSES

**LOSHBOUGH-JORDAN  
TOOL & MACHINE CO.**  
1625 STERLING AVE. ELKHART, INDIANA

## Lincoln Presents New Engine-Driven Welder

A new 200-ampere engine-driven arc welder of light weight, small size, and low cost for an engine-driven unit of its capacity, is announced by The Lincoln Electric Co., Cleveland.

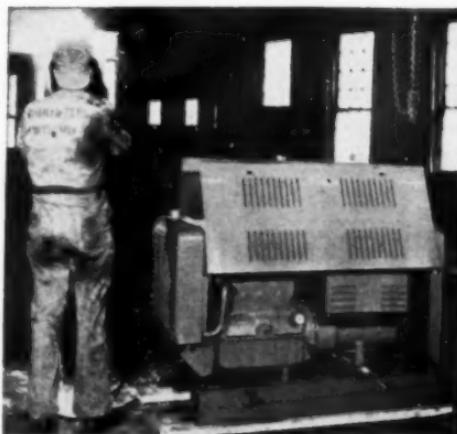
Designed as the "SAE-200 J" the welder is of the Junior type. It is light enough to be wheeled readily by one man, or lifted easily on its single balancing hook by average moderate-capacity chain or crane falls. The weight is under 900 pounds.

Ease of moving and handling are further enhanced by its size which also shows to advantage in the matter of floor space. Dimensions of the stationary model, are:—length, over radiator grille 56"; over hand crank 63 $\frac{1}{8}$ "; width 20 $\frac{1}{4}$ "; height 37 $\frac{3}{4}$ ". The portable model (shop type) is of the same length as the stationary type and 27 $\frac{1}{2}$ " wide (wheel clearance) by 44 $\frac{1}{2}$ " high. Floor space required for the stationary model is only 8 square feet.

Requirements for a wide range of applications for direct current arc welding are met, such as light-gauge metal by the metallic arc process; also car fenders, bodies, and galvanized sheet by the carbon arc method; repairs to cast iron parts such as cylinder heads and blocks; fabricating a wide variety of equipment; hard facing; etc. It produces uniform current for

speedy welding of practically all metals and alloys with either bare or shielded arc type electrodes.

Generator is of the Single-operator,



variable-voltage type with laminated pole pieces, increasing arc stability and simplifying welding. Current range, welding duty, is 40 amperes to 250 amperes for either bare, washed, or heavily coated electrode. At the lower part of its range, it delivers a current of light penetration characteristics for welding extremely light-gauge materials. At the upper portion, it delivers ample current for the speedy welding of plates, angles, and other relatively heavy jobs.

Class B insulation, used in the arma-



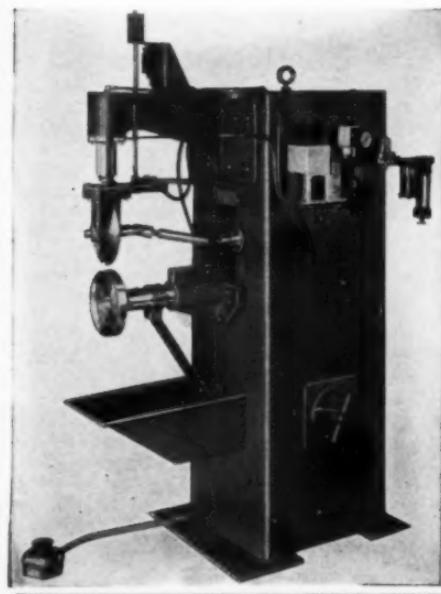
## GEARS IN STOCK— IMMEDIATE DELIVERY

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on gears of any kind. Send us your blue prints and inquiries.

Write for Catalog No. 70

**CHICAGO GEAR WORKS,**

449-45 N. OAKLEY BLVD.,  
CHICAGO, ILLINOIS



## The ACRO SEAM WELDERS

are designed for straight or circular seam welding, or can be furnished with a universal head. Either wheel or both wheels, can be driven. Equipped with full Electronic Control or mechanical interrupter. Speed either fixed or variable.

*Send for information on our complete line of ACRO WELDERS.*

**Acro Welder Mfg. Co.**  
1570 So. First St., Milwaukee, Wis.

## Four Steps to Quality

**THREADWELLS ARE—**

1. Accurately Manufactured
2. Absolutely Dependable
3. Carefully Selected
4. Skilfully Heat Treated

WRITE TODAY FOR  
CATALOG No. 10.



**THREADWELL  
TAP & DIE CO.**  
GREENFIELD, MASS.

# STANDARD PROTECTION against Breakdowns



SELF-LOCKING

## Hollow Set Screws WITH THE KNURLED POINTS

Accidents and breakdowns caused by ordinary set screws working loose just can't happen when your machines are equipped with "Unbrako" Self-Lockers. Once set up they stay absolutely tight . . . not a chance for them to vibrate loose which means far less maintenance work in the bargain. These screws can easily be set up or removed with the ordinary hex bar wrench and re-used indefinitely, always with the same effectiveness. Write us today for samples, prices and details.



Fig. 1645  
Pat's. Pend'g

## STANDARD PRESSED STEEL CO. JENKINTOWN, PENNA.

Boston  
Detroit  
Indianapolis

Box 559

Chicago  
St. Louis  
San Francisco

ture, contains no inflammable materials whatsoever. The coils, wound with glass-covered wire, are held in mica-lined slots, separated by mica dividers, and the leads are connected into the commutator by special, high-melting point solder.

Continuous voltage control, (job selector), and current control make it easy to select any type of arc and any arc intensity to suit the job. Controls are self-indicating. Change of welding current polarity is easily accomplished by switching electrode and current cable connections, which are held by wing-nut terminals on front of welder base.

The four-cylinder engine has 3-inch bore and 4-inch stroke with piston displacement of 113 cubic inches, delivering 26 h.p. at 1800 rpm., the speed at which the unit is operated. Fuel tank capacity is 8-gallons, enough for about one day normal operation.

## T. H. L. FRONT LEVER BENCH PUNCH

Built for hard, tough work — die cannot lose alignment with punch — all parts interchangeable.



Capacity —  
1/2" holes through  
3/16" steel; 13/32" through 1/4" steel.  
Can also be made for  
holes up to 7/8" in  
thinner metal. Stock  
punches and dies a-  
vailable from 1/16 to  
1/2" by 64ths. Weight,  
70 lbs.

T. H. Lewthwaite  
Machine Co.

(Est. 1890)  
311 E. 47th St.,  
NEW YORK

## Fafnir Develops Corrosion-Resistant Treatment

The Fafnir Bearing Co., New Britain, Conn., announces a process whereby exposed parts of ball bearing transmission units are being chemically treated to resist corrosion, without change in their physical properties or dimensions.

The process involves the formation of an oxide-layer which penetrates .0002" to .0003" into the surface of the metal, without changing its external dimensions. It is said that this protective layer, really a part of the metal itself, does not chip or peel, and is unaffected by temperature. The treatment is readily recognizable by the distinctive jet-black finish it imparts to the metal.

# MARKED - IDENTIFIED

*Permanently*



MODEL 25

PART NUMBERS, CATALOG NUMBERS,  
HEAT NUMBERS, SERIAL NUMBERS,  
PATENT NUMBERS  
MANUFACTURER-INSTRUCTION DATA-INSPECTION

Positive, Permanent MARKING ON YOUR PRODUCTS ASSIST PROSPECTS TO ORDER. MAKES IT EASIER TO BUY—NEW, REPEATS AND REPAIRS. GIVES YOU A DEFINITE RECORD OF PERTINENT DATA ON EACH PART PRODUCED.

The Pneumatic Marking Machine ILLUSTRATED IS OUR HI-DUTY MODEL 25 GENERAL PURPOSE TOOL FOR SHORT RUNS OR PRODUCTION WORK. IT OPERATES FROM YOUR SHOP AIR LINE AND IS ONE OF NUMEROUS MODELS BUILT TO PRODUCE NEAT, PERMANENT MARKINGS QUICKLY ON METAL FABRICATIONS.

WE WILL BE HAPPY TO MAKE SPECIFIC RECOMMENDATIONS UPON RECEIPT OF SAMPLES OR PRINTS OF PARTS TO BE MARKED, SHOWING APPROXIMATE LETTERING, ITS LOCATION ON THE PART, WITH REQUIRED HOURLY PRODUCTION.

**MARKED PARTS ADVERTISE  
IN THE RIGHT PLACE, AT THE RIGHT TIME.**

*Unlike John Alden —  
"They Speak For Themselves."*

**GEO. T. SCHMIDT, Inc.**

1802 Belle Plaine Ave., Chicago, Ill.  
Builders of Marking Equipment Since 1895.

Send for complete catalog of our full line of marking Tools, Machinery and Equipment.

## Rotor Tool Releases New Models

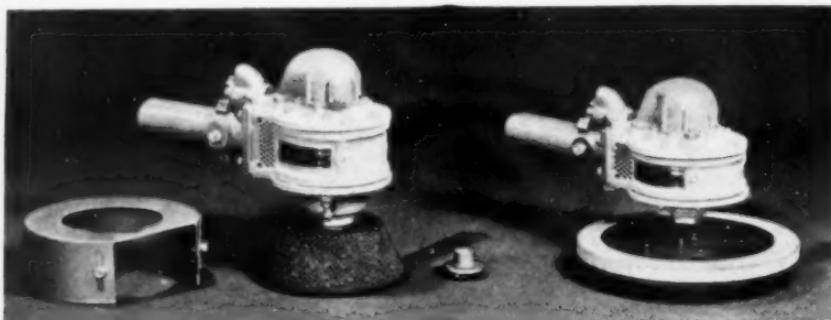
The Rotor Tool Co., 17325 Euclid Ave., Cleveland, announces two new vertical types of Air Grinders, the B-1X and the B-3X for which the following features are claimed:

Power of both models has been increased over 40% compared to preceding types.

Maximum power is developed with less than 10% drop in the free speed, which gives high load speed for fast cutting action of the grinding wheel or sanding disc.

Light weights—the B-1X weighs 10 lbs., the B-3X 12½ lbs.

The new Rotor governor, M-8001, is a new balanced multiport governor which controls the maximum speed within the limits of the Safety Code by



## The "Butterfly" Filing and Die Making Machine

Reg. U. S.  
Pat. Off.



Constructed as per  
specifications of United  
States Naval Aircraft  
Factories.

*Beware of imitations!*  
Our machine carries the  
Butterfly trade mark.

### NEW MODELS D. & E.L.

The "Butterfly" owes its ever increasing popularity to its high standard of efficiency. It is the quietest machine of its kind and is well adapted to highly accurate work. It is being used by the leading manufacturers of the United States and Europe and also by the United States Government.

*Write for folder  
D. and E. L.*

**HARVEY**  
**MANUFACTURING CORP.**  
**161 Grand St., New York, N. Y.**

compressed spring action which is not affected by variation in air pressure.

Low maintenance — the external blade type motor requires only two blades and when necessary to check blades to bring tool back to original power it is merely necessary to remove the cover plates without disassembly of the entire tool.

The tools are used for grinding with 6" x 4" x 5/8" cup wheels for welds, castings, etc.

Used with a 9" flexible pad, they are recommended for disc sanding or with 6" cup brushes for wire brushing.

The manufacturers claim that the tools are exceptionally well balanced, with the two handles 90° apart for easy control, and that the large area of contact of the cutting accessories ensures rapid production combined with ease of operation.

In addition to metal work, grinding, disc sanding, wire brushing, etc., these machines are widely used for the rapid surfacing of hard stone, such as marble, granite or concrete, equipped with a special stone wheel operated dry at 5000 r. p. m.

### Lincoln Industrial Progress Award

A 2½ year program of scientific study, culminating in the payment of 453 awards, totaling \$200,000 is announced by The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

The awards are established for studies bringing out the benefits of a social, economic or commercial nature, such as reduction or elimination of hazards to safety and health; greater availability of comforts and conveniences through reduced prices; greater utility and durability of machines and structures, as well as industrial benefits such as cost savings and other advantages in manufacture, fabrication or construction.

Studies will cover the automotive, aircraft, railroad, watercraft, structural, furniture and fixture, commercial welding, welderies, functional machinery, industrial machinery and maintenance fields.

The grand award will be \$13,700 for the best progress report submitted.

Main program awards will be \$10,000, \$7500 and \$5000, and there will be numerous classifications, divisional and honorable mention awards well worth winning.

Authors of the studies may be engineers, designers, architects, draftsmen, plant superintendents, produc-

tion managers, foremen, owners or operators of fabricating or repair shops. One author or a group may submit a study.

Participants have until June 1, 1942 to pursue their studies and prepare reports summarizing them.

All inquiries concerning the award program should be addressed to the Secretary, The James F. Lincoln Arc Welding Foundation, Cleveland, Ohio.

A New Line . . .

the **500**, *Series* **ROTARY GEARED PUMPS**

with HERRINGBONE GEARS



-Quiet in  
operation  
... for pressures  
up to 500 lbs.

Ask for circular

Brown & Sharpe Mfg. Co.,  
Providence, R. I., U. S. A.

**BROWN & SHARPE**  
LBS PUMPS

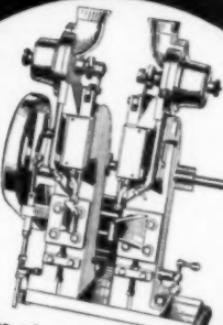
# AUTOMATIC RIVET SETTER

For radios, switches,  
toys, electric parts  
and appliances, auto  
parts and accessories,  
and other small  
assemblies.

Will give you volume production  
savings even on  
short assembly runs. Less  
capital investment.

WITH  
*Adjustable*  
CENTERS

Sets 1 or 2  
rivets at a time



Centers adaptable to 6". For setting rivets up to  $\frac{1}{4}$ " body diameter. Bench and pedestal types.

No obligation for assembly analysis. Send sample or blueprint with inquiry.

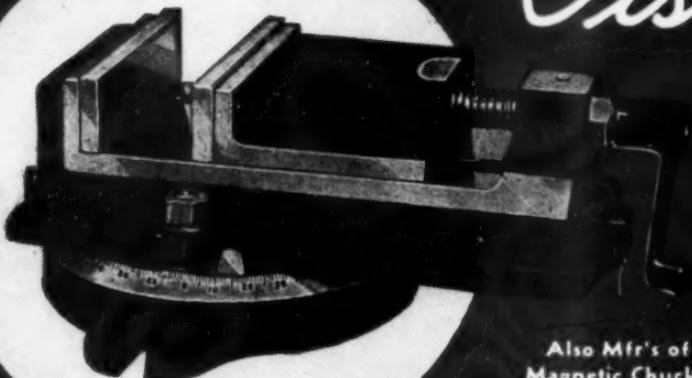
**CHICAGO RIVET & MACHINE COMPANY**

TUBULAR AND SPLIT RIVETS IN ALL RIVET METALS

1855 SO. 54th AVE. (Cicero P. O.) CHICAGO, ILLINOIS

# Swivel MILLING MACHINE

## Vises



Also Mfr's of  
Magnetic Chucks  
Demagnetizers  
Lathe Chucks  
Power Hack Saws  
Dividing Heads

### 85 LB. MASTER

HEAVY DUTY  
6½" SIZE

**\$27.00**

Suitable for milling machines, drill presses, shapers, etc., these large semi-steel vises may be used plain or swivel. The steel jaws are sturdy. Key slots provide for attachment to machine table holding surface, with jaws at right angle or parallel to table. Junior 4½" size, 45 pounds, **\$19.50**

**L-W CHUCK CO**

1-7 N. St. Clair St.,

Toledo, Ohio



# PER BOND

## GREATEST FORWARD STEP IN 30 YEARS

V/T Super Bond is one of the most important developments in mounted wheels. Wherever the use of a tough, hard bond that will stand the gaff is required, V/T Super Bond will be found without peer. Nothing can compare with it in endurance, stamina and performance. There is a shape and size to handle every grinding job faster, better and at lower cost.

### Chicago Mounted Wheels

✓ The FIRST small abrasive wheels mounted on steel mandrels to be offered to industry.

✓ The FIRST with this special new and exclusive bond - V/T Super Bond, unequalled in strength and long life.



### HANDEE TOOL OF 1001 USES

Here's a small "power house" that can be carried to any part of the shop and used wherever there is an electric outlet. Repairs hard-to-get-at parts on machinery without removing the part—smooths off rough spots on dies and moulds—cleans delicate mechanisms—grinds, drills, polishes, cuts, routs, carves, sands, saws, sharpens, engraves, cleans, etc. Uses 300 accessories. There are more Handees in use today than all other tools of this type combined.

De Luxe model weighs 12 oz. 25,000 r.p.m. \$18.50 postpaid with 6 Accessories.

TRY A HANDEE FOR 10 DAYS IN YOUR OWN PLANT



**EEL & MFG. CO.**

Products for 40 Years

HB,

Chicago, Ill.

1332 Williams St.,

Montreal

- Send Free Wheel. Size \_\_\_\_\_
- Free Wall Chart
- Catalog of Handee Products and Grinding Wheels.
- De Luxe Handee on 10-Days Trial.

Name \_\_\_\_\_

Address \_\_\_\_\_

START THE

SUN MON TUE WED THU FRI SAT

*New Year*

OUT RIGHT



Don't begin the NEW YEAR with the worn-out tools of the old year. They may be good enough for old Father Time, but they can't compete with modern competition.

Take inventory of your tools now.

Do your cutters, drills, reamers, files and end mills need re-cutting?

Are your pneumatic tools worn and in need of being rebuilt to original size?

Do you want longer life imparted to your machine parts and dies?

Are you in need of good pneumatic tools?

If you can answer Yes to any, or all of these questions, then it will pay you to send for literature on Tool Salvage, Hard Chrome Plating and Master Chipping Hammers.

Do It Today

**EASTERN CUTTER  
SALVAGE CORP.**

Newark, New Jersey

**MASTER TOOL  
CO., INC.**

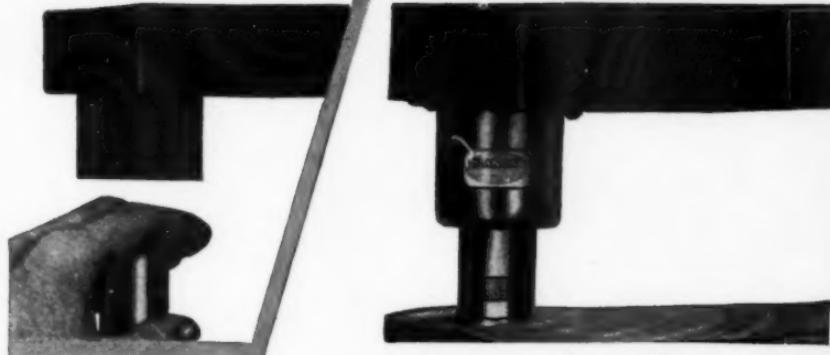
Cleveland, Ohio

**THE MASTER  
CHROME SERVICE, INC.**

Cleveland, Ohio

# DANGER AHEAD

# Safe



## *with Danly Safety Guide Post Covers*

Most press accidents today are pure accidents; and in cases where the bushing leaves the guide post, the resulting gap is a source of danger.

Some worker places a hand or arm between the bushing and the post, when the press is down or power is off. When the press is started, serious injury results. Also carelessness or slips in handling get the stock between guide post and bushing, resulting in a "wreck" of die, die set or press—piling up expense and crippling production.

These "didn't know it was loaded" types of accidents are the most difficult to prevent—but Danly Safety Guide Post Covers applied to all dies where the bushing leaves the post are a low cost way of providing automatic insurance against them. They cover the gap so that nothing can enter; and they can also be equipped with oilers for positive lubrication.

A new folder "Danger Ahead" fully describes Danly Safety Guide Post Covers and their uses. Send for your copy today.

DANLY MACHINE SPECIALTIES, Inc. • 2112 So. 52nd Ave., Chicago, Ill.

DANLY DIE SETS AND  
DIE MAKERS' SUPPLIES  
FROM THE 9 DANLY  
BRANCH STOCKS

LONG ISLAND CITY, N. Y.  
36-12 34th STREET

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16 COMMERCIAL STREET

MILWAUKEE, WIS.

513 EAST BUFFALO STREET



**DUCOMMUN**

Metals and Supply Co.  
Los Angeles—San Francisco

# DANLY DIE SETS and DIE MAKERS' SUPPLIES

# AT YOUR COMMAND



## 4 SPEEDS

Shaper operation is made more flexible — more efficient with a SCHULTES Four Speed Drive—with just the right speed for the job—at Your Finger-Tip.

The modern drives are equally valuable for lathes, milling machines, drills or punch presses. They're low in first cost and easily attached. Soon repay their cost through savings which they make possible.

Schultes Drives incorporate all the latest engineering improvements and advantages. They're dependable, economical to operate and maintain, and will show definite savings in production costs.

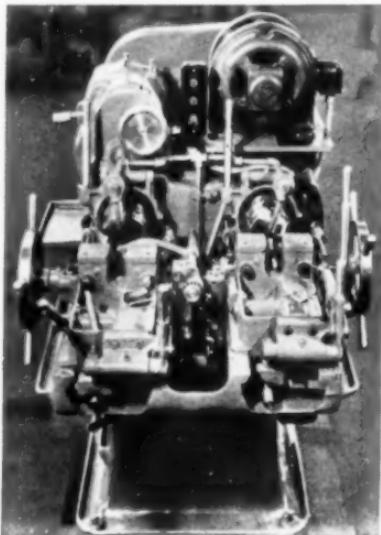
*Write for bulletin  
giving complete information*

**Westlief Tool & Die Co.**  
428 Bellevue Ave., Detroit

### Landis $\frac{7}{8}$ " Turning Machine

Here is a  $\frac{7}{8}$ " double head machine, recently equipped by Landis Machine Co., Waynesboro, Penna., for a combination pointing, beveling, turning and facing operation.

The machine is a standard Landis  $\frac{7}{8}$ " double head threading machine equipped with leadscrews and with  $\frac{7}{8}$ " hardened and ground heads. Several fixtures are added for this special turning operation.



These include the milling cutters, which replace the usual chasers; a spring actuated tool holder to carry the pointing and beveling tool (two of these special tools are shown on the right hand carriage), and the automatic work stop for positioning the work in the vises.

Special milling cutters can be used for reducing the body diameters of long length bolts; or cutters for a combination turning and shoulder facing operation can be substituted for the regular milling cutters.

The pointing and beveling tools are carried in a holder extending entirely



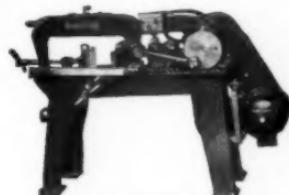
No. W-3B-Wet Cut, high speed 6"x6" motor drive

Fast, Smooth Action—Hydraulic Feed and control—2 speeds standard.

*"Standard The World Over"*

## RACINE

The new, fast cutting, Racine Utility saws—Hydraulic Feed-Dry Cutting or Wet Cutting—Write for remarkably low prices—Also a full line of heavy duty machines up to 14x20" capacity.

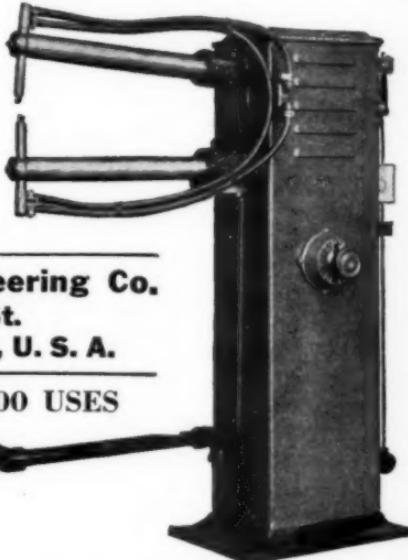


No. D-3B Dry Cut 6"x6"

**RACINE TOOL & MACHINE COMPANY**  
1754 STATE ST. - - - RACINE, WIS. U. S. A.

## DYER SPOT WELDERS

from  
2½ KW to 35 KW  
Bench and Floor Type



**Dyer Welder & Engineering Co.**  
2727 Walnut St.  
Kansas City, Missouri, U. S. A.

THE WELDER OF 1000 USES

**For Sheet Metal**  
and  
**Wire Products**

through the spindle. This can be adjusted, at rear of spindle, to permit the turning, pointing, and beveling of work for the length of 5".

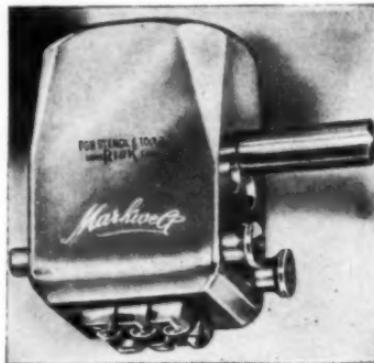
Turning operations on a machine of this type are said to offer increased production possibilities as well as accuracy. The four milling cutters operating in a single plane about the axis of the work assure a uniform cutting action that produces a perfectly round turning job. The machine can also be used for threading if desired.

### Marking Hot Metals

The Pittsburgh Stencil and Tool Co., 713 Crafts Bldg., Pittsburgh, Pa., manufacturers of Rick Markwell Holders for stamping steel and other products, announces a new tandem holder which is particularly valuable for stamping intensely hot metals.

The only moving part is a sturdy pin, in each row of type, which carries its own spring. One quick motion locks it; another unlocks it.

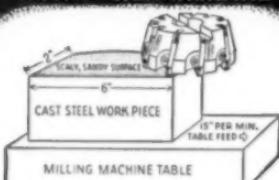
Markwell holders, which handle type made for other holders as well as its



own, employ safaloy type, a special alloy, which is said to be practically unbreakable. Markwell holders come in all sizes from  $\frac{1}{8}$ " type up to 1" or larger.

The manufacturer will be glad to mail copies on request.

### MILLING SCALY STEEL CASTINGS with KENNAMETAL



Cutter shown is a 5 in. diam., ten blade, McCrosky Jack-Lock Milling Cutter made by the McCrosky Tool Corp., Meadville, Pa.

### MACHINES IS TO 30 TIMES MORE PIECES IN 1/6 THE TIME PER PIECE

TYPE OF BLADE	PIECES PER GRIND	MILL. TIME PER PIECE
KENNAMETAL Tipped	300	Less than $\frac{1}{2}$ min.
High Speed Steel	10 to 20	3 minutes

The above tests were made on scaly, sandy, hard cast steel, yet there was no breakage of the KENNAMETAL-tipped blades. Results shown in the table are typical of the increased production made possible by KENNAMETAL.

Write for complete information today.



### DON'T DISCARD IT . . . . .

Effect a 30% to 75% saving in tool costs, by having your worn-out or obsolete tools made over by RENU — and guaranteed as good as new, both for appearance and performance.

RENU TOOL CO.,  
375 E. MILWAUKEE AVE.,  
DETROIT, MICHIGAN

RENU  
IT!

## St. Clair Handles Tantung in East

"Strengthening Designs for Cemented Carbide Tools" was the title of a lead article by Leo J. St. Clair in the October issue of THE BLUE BOOK.

Mr. St. Clair is President of the recently formed General Tool & Die Corp., 62 Franklin St., East Orange, N. J. He announces that his Company will handle distribution of Fansteel's new hard facing material "Tantung" in the States of North Carolina, Maryland, Delaware, Pennsylvania, New York, New Jersey and all of New England.

Mr. St. Clair summarizes the advantages of this material as follows:

1 — It is as hard as hardened steel.

2 — Wear resistance is said to be from five to 20 times that of hardened steel.

3 — Hardness is retained at high temperatures.

4 — High acid and corrosion resistance.

5 — Low coefficient of friction.

6 — Thermal conductivity is extremely low.

It is recommended for long knives, centerless grinder blades, grinder centers, cutting edges on knives and instruments. It is very tough and can be used on shaper and planer tools for interrupted cuts, etc.

It is easily applied to iron or steel parts, by melting the Tantung with a highly carbonized acety-

lene flame, preheating the part to which it is to be applied. Properly applied, the Tantung is free from blow holes and a keen cutting edge can be produced by grinding.

Mr. St. Clair's Company will market Ramet Carbide in the form of tools. Also Rexalloy solid and tipped tools.

Stephen Carmody is Vice President of the new Company. Arthur E. Engler is Secretary. All have had long experience in the carbide industry.



## FOR ALL MAKES OF MACHINES

### Adjustable and Solid

# SPACING COLLARS



### Adjustable Spacing Collars

For straddle milling, gang milling and multiple slotting set-ups. They eliminate the use of shims.

### Solid Spacing Collars

Are standard .001" to 3" thick. Less than  $\frac{1}{8}$ " are not hardened.



**SCULLY-JONES  
and COMPANY**  
1905 S. Rockwell St.,  
CHICAGO, ILLINOIS

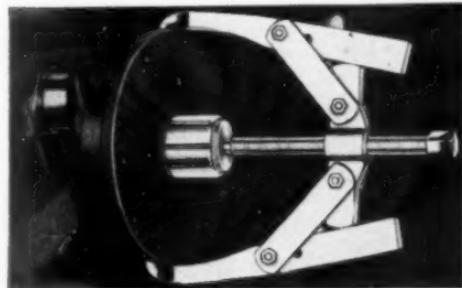
### OTC System Simplifies Pulling Jobs

OTC Gripomatic Pullers offer an easy, safe, quick way to remove and replace gears, bearings, wheels, pinions, ball races, shafts, pulleys, etc.

The OTC patented gripping feature is claimed to prevent the jaws from slipping off the work. The jaws are thin to allow working in close quarters, and no adjustments or extra equipment are needed to hold them in place.

Six standard sizes in the line cover a wide range of work. Special pullers can be designed to meet special requirements. The sizes covered by these pullers range from 0" to 18" with pulling capacities of from 12,900 pounds to 80,000 pounds.

Illustration shows the No. 1003 puller removing a main bearing from an engine such as used in industrial units.



place gears and bearings as well as remove them.

A special service bulletin containing time-saving instructions for many pulling operations will be mailed on request to Owatonna Tool Co., 355 Cedar St., Owatonna, Minn.

## DESMOND GRINDING WHEEL DRESSERS & CUTTERS



We manufacture the only complete line of Dressers and Cutters. Write for catalog and name of your nearest dealer.

**DESMOND-STEPHAN MFG. CO.**

URBANA, OHIO

Canadian D. S. Mfg. Co., Ltd.  
Hamilton, Ont.

### BUY THIS GENUINE

#### $\frac{1}{2}$ " SpeedWay Drill

and get these features

AT THE LOWEST PRICE EVER MADE ON  
A QUALITY DRILL OF THIS SIZE

High torque SpeedWay Drill Motor  
Streamlined Air Cooled Die-Cast Case;  
Direct Thrust Breast Plate Handle;  
Removable side handle for close  
quarters; Self Aligning Oilless Bearings;  
500 R. P. M. Operating Speed  
Smooth Sliding Thumb Switch,

Write for circulars and nearest  
dealer location.

**SpeedWay Manufacturing Co.**  
1822 S. 52nd Ave., Cicero, Ill.

## PYRO THE SIMPLIFIED OPTICAL PYROMETER



Unique construction enables operators to rapidly determine temperature even on minute spots, fast moving objects or the smallest streams; no correction charts, no accessories, no upkeep.

**THE PYROMETER INSTRUMENT CO.**  
102-105 Lafayette St., New York, N. Y.

## Business Outlook

A satisfactory first quarter for business in general throughout the U. S., was forecast by salesmen of The Warner & Swasey Co., at a recent conference.

The 21 salesmen whose territories embrace the whole country were asked: — "What is the outlook for business in general in your territory for the first quarter of 1940?"

Sixteen answered "good" and said "fair". Not one thought business in his territory would be poor.

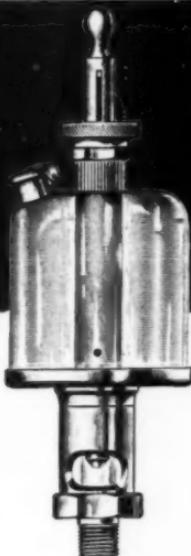
Defining "producers' goods" as equipment, machinery, materials, etc., bought by Companies, and "consumers' goods" as merchandise, household devices, cars, etc., the men were quizzed on these lines. Seventeen rated producers goods prospects as "good" and four said they were "fair." Eleven rated consumers goods industries as "good" and ten said "fair." Opinions as to retail trade tallied ten "good" and eleven "fair."

Every one of the 21 believed that today's business reflects actual demand and consumption rather than inventory buildup. The only exception was in brass and copper products, chiefly for plumbing and building, where a Winter build-up is natural in expectation of Spring and Summer activity.

While it was noted that some manufacturers had covered future require-

**OIL when  
and as you  
need it!**

## GITS unbreakable SIGHT GRAVITY NEEDLE VALVE ADJUSTMENT FEED OILER



Oil flow may be adjusted as desired, or completely shut off by adjustable needle valve. Modern, streamline, unbreakable bottle eliminates danger of broken glass in production.

Complete details on request.

## GITS BROS. MFG. Co.

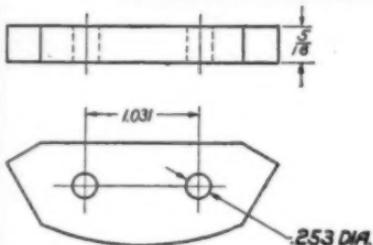
29 years of oil cup experience

ments, based on anticipated business, the general opinion was that barring an unexpected or sudden falling-off in business, manufacturers would not have unwanted inventory.

Charles J. Stilwell, President, points out that while these are personal opinions, they are reasonably authentic because the salesmen are in daily contact with a wide range of manufacturing interests, and the machine tool requirements of these Companies reflect the nature and extent of the business being done now, and in prospect. Most of the business is for the peace time needs of our people.



## don't drill small holes



This cam, made of  $5/16"$  thick 1020 material, is being blanked and pierced with two  $.253"$  holes in a compound die, through the use of DURABLE Patent Piercing Punches with Intermeshing Sleeves, and the user reports runs as high as 40,000 pieces without punch breakage. The holes are straight without draft and ready for use. Formerly the pieces were blanked, drilled and reamed.

Over 80% of our customers have expressed satisfaction with repeat orders to be used on other than their original applications.

Write TODAY for free handbook showing construction and presenting many typical dies used by industrial leaders.

**DURABLE PUNCH & DIE CO.**  
2224 W. Grand Ave., Chicago, Ill.

## Greenerd Announces New 10 Ton Press

Heavier and more rugged construction distinguishes the new 10 ton completely self-contained hydraulic press developed by Greenerd Arbor Press Co., 141 Crown St., Nashua, N. H. In it, the makers have tried to build a high speed machine with as little deflection as possible.

It can be equipped with a 10 h.p. motor to give a constant speed of the ram under the full 10 tons pressure of  $208"$  per minute, with a return speed of  $280"$  per minute.

Or it can be equipped with a 5 h. p. motor to give a constant speed of  $88"$  per minute. Another alternative involves the use of a 5 h.p. motor and double pump, giving a rapid traverse up to 4 tons pressure at the rate of  $222"$  per minute, with working speed from 4 to 10 tons at the rate of  $88"$  per minute.

Thus, use of the same frame with different hydraulic and motor equipment provides five different models—some with high speed and others with double pump which will give a rapid traverse up to four tons pressure and change over to slower working speed for higher pressures, making a high speed press with lower HP input.

Pressures can be predeterminedly set on any of the combinations.

All machines have foot control with power stops for the ram. Ram is put into motion by pressure on pedal, and pressure will remain on work until pressure is released, which automatically returns ram to power stop, and this may be set at any desired point within the 16-inch ram stroke.



### Ross Air Control Valve for Heavy Duty

A new, heavy duty air control valve is announced by Ross Operating Valve Co., 6480 Epworth Blvd., Detroit. The manufacturer says that like all other Ross valves, this also is a poppet type valve with the mounting flange, the uprights, lever and other parts engineered much heavier than the standard valves. Special alloy lever and



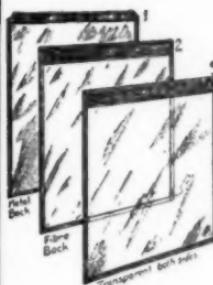
rockers arm pins of increased diameter, fitted with needle type roller bearings, larger stuffing boxes, stainless steel poppet stems and retainers, and other features provide this new valve with extra strength and wear, far beyond what actual usage really demands.

Mounting dimensions, pipe connection locations and bolt holes in this new valve remain the same as in the standard type Ross valves, which design permits mounting the valves on a bracket, a desirable feature which allows for quick, easy replacement should servicing become necessary. Plants where equipment of this type gets extremely rough usage are showing a keen interest in this new valve and have already placed advance orders.

### Desmond-Stephan Production Vises

This new Simplex vise is designed to save time on production filing, fitting

### Protect Shop Orders, Drawings, Blueprints...



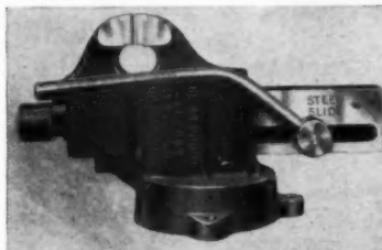
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Any size or style to order, stiff or flexible, to suit your requirements.

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Cleveland, O.

or assembly work. Raising or lowering the vise handle instantly opens or closes the vise. A cam in the slide gives a  $\frac{1}{4}$ " throw to enable work to



be inserted or removed. In setting the vise for the job, the handle is raised and then the knurled knob is turned until the jaw opening is  $\frac{1}{4}$ " more than the width of the piece.

Three sizes are available each, in the stationary base and swivel base types.

Address The Desmond-Stephan Mfg. Co., Urbana, O., for bulletins giving full information.



**Reamer and Cutter  
Grinder**

**Here is one machine that is  
still within the range of your  
pocket book.**

**\$307.50**



**Outstanding! Why?**

At the astonishingly low price of \$307.50 you can buy this Universal Tool that will do any kind of a tool sharpening job encountered in the average shop such as milling cutters, reamers, taps, end mills, metal slitting saws, carbony bits, etc. And what is most important of all, you can do the work in approximately one half the time required on large machines costing from 3 to 5 times as much. Even if you have a Universal cutter grinder now, you cannot afford to tie up a big expensive machine for the average small sharpening job.

This machine is so simple and easy to operate, and involves such a nominal investment, that it is economical to install one in each tool crib instead of routing all sharpening jobs to one main tool room.

The K-O Grinder can be used to advantage in many manufacturing operations. It is easy to attach special holding fixtures. The machine can be purchased with or without attachments if desired. Ask for bulletin RG-39-H.

**K. O. LEE & SON CO.**

*Aberdeen, S.D.*

*"practical tools for practical men"*



**Preventing Punch Press  
Accidents**

The Universal Punch Press Guard was designed to prevent accidents in plants using punch presses, where



hand-fed operations are necessary. It is simple in construction and positive in action, and makes it impossible for the operator to keep his hands on the die when the ram is descending. Intended primarily for presses, it can be applied to almost any type of ram action machines including spot welders.

Reducing insurance costs through improvement of accident records, Universal Guards are also asserted to help increase production. Operators can speed-up the work with assurance of safety.

The illustration shows an upright press application. All Guards are equipped with brackets making it possible to tilt the press as desired. A special hinge construction permits swinging the device up out of the way for the installation of dies, and permitting the press to be used for blanking operations without the necessity of disconnecting the Guard from the press.

Address Grand Haven Stamped Products Co., Grand Haven, Mich., for a bulletin giving full details.

### Johansson Gage Sales Up

Sales of Johansson gage blocks during October and November reached the highest point since May 1929, it was said today by the Johansson Division, Ford Motor Co. Enabling quick and accurate measurements to be taken in millionths of an inch, the gages are the backbone of production methods in a great variety of industries. A universal standard of measurement, the gages insure that parts made to the same specifications by factories in widely separated parts

of the world will be interchangeable, a necessity in modern mass-production processes.

Coincident with the report on recent sales activity, the Johansson Division announced the addition of chromium-plated gage blocks to the present line. The plating process provides a hardened surface more resistant to service wear than is possible with the plain steel blocks. The chromium-plating process will be applied, if desired, to sets of gage blocks returned to the factory for reconditioning.



## STANDARDIZED JIG BUSHINGS

Prompt delivery from stock on over 10,900 standard items—over 6700 ACME Standard—over 4200 A. S. A. Standard—all completely finished ready for use. *Special sizes made to order.*

Made in our new plant by the most exacting and scientific methods—insuring accurate fit plus long wear—concentric within .0003" full indicator reading.

Send for bulletin containing complete data and low prices. Satisfactory service guaranteed.

Also manufacturers of complete machine parts, specializing in hardened and ground parts requiring extremely close limits, lapped fits, etc. also hydraulic appliances for pressures up to 20,000 lb. per square inch.

**ACME Industrial Co.**  
210 N. LAFLIN ST., + CHICAGO, ILL.

## Carbolyo Perfects Extrusion Process

Carbolyo cemented carbide now can be produced in the form of tubing, spirals, and round or shaped bars by means of an extrusion process.

Available in lengths up to 20" and within a diameter range of from .015" to  $\frac{3}{8}$ " O. D., these rods, spirals and tubes are considered a distinct innovation compared to previous practice. Formerly such parts were available only within an extremely limited size range. With the new process, Carbolyo parts are formed directly into the shapes desired, eliminating most of the customary hand forming operations.

To those familiar with the limitations ordinarily encountered in working cemented carbides, the Carbolyo tubing

now produced is of especial interest. This can be made as small as .060" outside diameter by .030" inside di-



ameter, leaving a wall thickness of .015".

Particularly interesting is a supplementary process, by means of which Carbolyo rods, etc., can be bent to various shapes. The 5" dia. ring illustrated was produced through this process. It consists of a round rod curved to form a ring, with the ends joined together.

Although the processes have by no means reached the stage of maximum utilization, and in some phases are still considered in the process of development, many Carbolyo products, such as core bushings for ceramic dies, wire guides, valve needles, triangular glass drills, textile guides, etc., are now being produced by these methods.

In this process, the dry powder is mixed with a plasticizing medium and can then be formed by extrusion or molding into almost any shape. It is asserted that the material is as good in every respect as that made by the standard cold press or hot press methods.

Address Carbolyo Co., Inc., 11139 E. 8 Mile Blvd., Detroit, Mich., for further details.

*Shear Cut*

# END MILLS

You Save Time, Trouble and Money by specifying PROGRESSIVE Shear-Cut End Mills. They cut faster, easier and leave the smooth finish you want.

Write TODAY for catalog and prices on the complete PROGRESSIVE Line

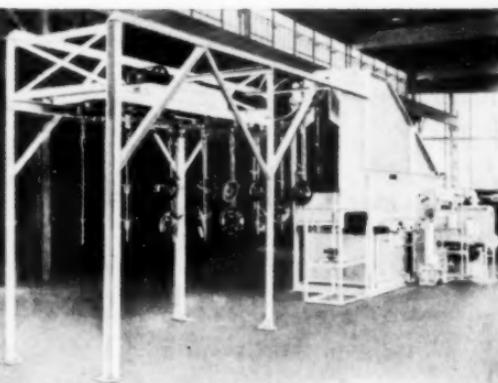
PROGRESSIVE TOOL & CUTTER CO.  
2345 WOLCOTT ST. • FERNDALE, MICH.

### One-Dip Type Detrex Degreaser

Outstanding operating and maintenance economies in the cleaning of various metal parts are claimed to result from the unique features incorporated in the one-dip, or liquid-vapor design of Detrex Degreaser. This machine is an addition to the complete line of metal cleaning and finishing equipment made by Detroit Rex Products Co., 13005 Hillview Avenue, Detroit, Mich.

In addition to the usual high speed production cleaning with minimum space requirements, this new design is said to have exceptionally low maintenance requirements combined with thorough cleaning in spite of the heavy carry-in of dirt, metallic chips, and oil.

The cleaning cycle consists of immersing the work in boiling solvent and passing it out through solvent vapors.



At the exit end, there is a light oil spray system that can be used to rust proof the work as is desirable when it is to be placed in storage for any length of time.

The return-type conveyor system is completely self-contained with the load



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#### ETCHERS and DEMAGNETIZERS

Let us tell you the many advantages of our new D. C. and A. C. models now available. Also, see our new line of Magnetic Parallels and Midget Chucks.

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**SAVES AN AVERAGE OF \$4.80  
EACH HOUR IT'S USED**



Inside and outside cuts on dies, shoes, templets and endless other jobs can be done in a small fraction of the time required by former methods. Saws, files and polishes. A highly developed, large capacity machine.

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**THE TANNEWITZ WORKS**  
GRAND RAPIDS - MICHIGAN

and unload stations extending approximately 19 ft. from the machine.

This design is manufactured in a wide range of sizes and capacities, but the unit shown is approximately 37 ft. long; 7 ft. 8 in. wide; 12 ft. 4 in. high. Work clearances through the degreaser are:—length, 12 in.; width, 16 in.; depth, 28 in. (58 in. hanging from the top of I-beam to bottom of work.)

Solvent capacity of boiling chamber is 188 gallons, and the clean solvent storage tank is of sufficient capacity to hold all solvent from the machine. The approximate weight, not including solvent still and filter, is 7,500 lbs. The rated production capacity is 10,000 lbs. of work per hour.

### Sterling Offers a New Portable Sander

Manufacturers of the Sterling Speed-Bloc Sander (air driven) announce a new product—the Sterling Gyro Electric Sanders.

It has a self-contained, gear-driven electric motor operating at 4000 r.p.m. and can be plugged into any socket.



The flexible sanding pad is said to operate in a movement which closely simulates the hand sanding motion of the skilled craftsman. Abrasive paper is easily attached to the sanding pad and held in place by a special holder. It uses  $\frac{1}{4}$  of a standard size 9" x 11" sheet. Any type or make of abrasive paper may be used. It can also be used for rubbing and polishing.

The unit is sturdily constructed for continuous service yet light in weight— $3\frac{1}{2}$  lbs. One hand is all that is needed to guide the machine over the work.

For more complete information write Sterling Products Co., at 2459 Woodward Ave., Detroit, Mich.

### \$25 BUYS A POSTEL (f. o. b. Minneapolis) DIE FILER

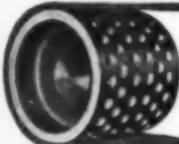


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915 Washington Ave., So.  
Minneapolis, Minn.

#### NO BELT SLIPS WITH VACUUM CUP METAL PULLEYS



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Solid and Split

Sizes 2' to 72' Dia.

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#### NEW LOW PRICED PRODUCTION LINE

##### SEE PART LIST PRICES BELOW

Dia.	Face	Price	Dia.	Face	Price
2 1/2" x 2 1/2"	—	\$1.25	4 1/2" x 4 1/2"	—	\$3.20
2 1/2" x 2 1/2"	—	1.45	4 1/2" x 4"	—	3.35
2 1/2" x 2 1/2"	—	1.65	4 1/2" x 5 1/2"	—	3.95
3" x 3"	—	2.25	6" x 5"	—	4.75

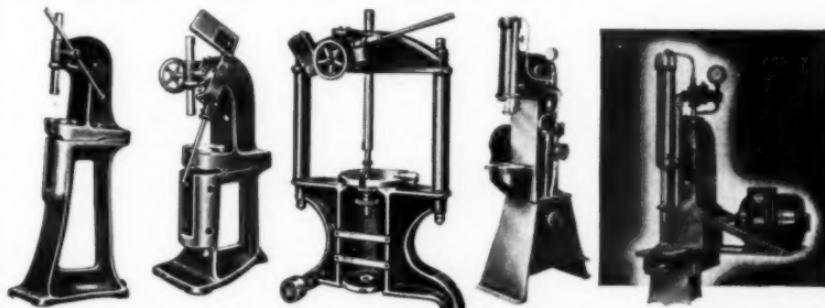
Try one at our risk on your worst drive. You be the Judge.

VACUUM CUP METAL PULLEY CO., INC.  
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your  
Production

# BROACH and ASSEMBLE

**65** standard styles and sizes—manually operated presses from  $\frac{1}{4}$  to 35 tons pressure—motor driven hydraulic presses from  $1\frac{1}{2}$  to 15 tons pressure. Write for catalog F.



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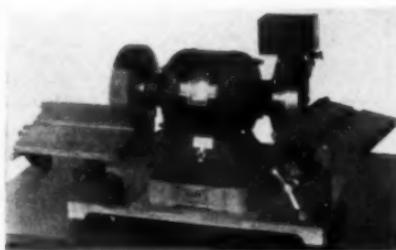
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NEW HAMPSHIRE

## FOR CARBIDE TIPPED TOOLS THE ALL IN ONE TOOL GRINDER

Complete with —



TWO WORK TABLES

ONE 6" x  $1\frac{1}{2}$ " GRINDING WHEELONE 6" x  $\frac{1}{2}$ " FACE DIAMOND  
SET LAP

ONE PROTRACTOR

110 VOLT, 60 C. A. C. MOTOR  
1750 R. P. M.

PRICE COMPLETE.....\$108

220 V. 60 C. 3 PHASE MOTOR \$5.00 extra

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DELIVERY FROM STOCK

T. C. M. MFG. CO.,

Harrison, N. J.

**Gits Self-Closing Dust Caps**

Designed primarily for protecting air hose on road trailers, these self-closing dust caps should have many other applications in industry.

Attached by a 1½" O. D. clamp, the hinged lid is maintained in the closed position by a substantial coiled spring. In trailer use, the caps are clamped around the booster couplings. Air hoses are quickly attached or detached and the spring caps are always ready to spring down into place and exclude

dust and dirt.

Another form of cap is also available for gasoline tank filler openings on

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by using

**WALTON  
TAP  
EXTRACTORS**

They remove taps broken at or below the surface of the hole easily, quickly and without injury to the threads.

Send for Folder 132 giving sizes, styles and prices.

Test their worth by 30-day Free Trial.

**The Walton Co.**  
95 ALLYN STREET  
HARTFORD, CONN.



motor vehicles, fitting over a 2 9/16" or 2 1/4" tank neck. The device is attached to the tank with several small screws. The self-closing hinge lid is reinforced by a lip attached to the top of the lid, adding extra pressure to the gasket seat inside of lid. A cork gasket is placed inside of the flange to prevent leakage.

Full details may be had by addressing Gits Brothers Mfg. Co., 1860 So. Kilbourn Ave., Chicago.

**Accurate Hole Transfer Made Easy With  
NIELSEN TRANSFER SCREWS**



Simply insert in holes, invert, strike sharply and you have centers and drill circles perfectly located. Reduce time and eliminate spoilage of other methods. 7 sizes U.S.S.—Inexpensive—last for years.

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**Why Not Buy The Original Electric Etcher?**

**MARK IRON AND STEEL  
THE ETCHOGRAPH WAY**

New ELKONITE TIP pencil.  
New Baby Grand Model at a  
lower price.

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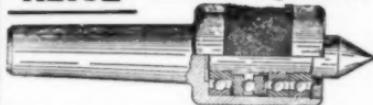
## Taking the Machine to the Job

Here's a good example of the practicability, efficiency and convenience of taking the tool to the work, rather than



the work to the tool. A portable Stow flexible shaft machine is shown as it was being used at the Shipyard to grind the bore of the new propeller of the U. S. S. Bear, just before that famous ship set out on the Byrd Antarctic Exploration.

## "ALIVE" Ball Bearing Centers



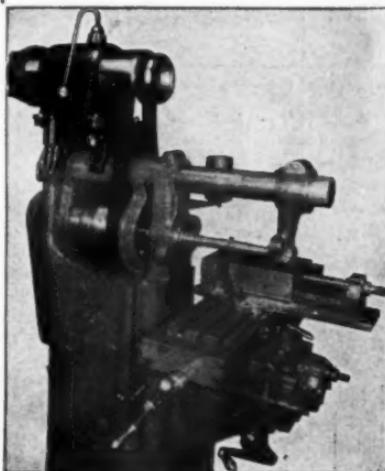
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Write TODAY — and let us tell you more about them.

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## LIMA GEARSHIFT MOTOR



### FEATURES

Eliminates countershafts . . . 4 speed automotive transmission . . . All steel, heat-treated gears run in bath of oil . . . Hand wheel rotation of machine spindle . . . Instant reversability with all speeds . . . Designed for 1800, 1200 and 900 r.p.m. motors, either single or two speed . . . Adaptable for flat or "V" belt . . . Easily installed.

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### Tubular Lead Anode for Chromium Plating

A tubular design of lead plating anode, stated to give unusually even throwing power and low resistance for the current discharge surface available, is being manufactured by Acme Lead-Burning Co., 3725 West 73rd St., Cleveland. It may be supplied either pure

lead or in 6% antimonial, as may be specified. This type of anode is particularly recommended for the center anode busbars of a tank, because of the equal current-distribution on all

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Combination Etchtool —  
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Tools in 1

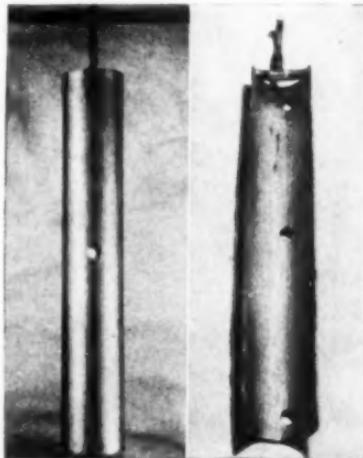


Luma Marking and  
Demagnetizing SIMULTANEOUSLY

Writes on hardened steel — demagnetizes at  
the same time—with carbon point does light  
spot annealing and soldering jobs. Compact—  
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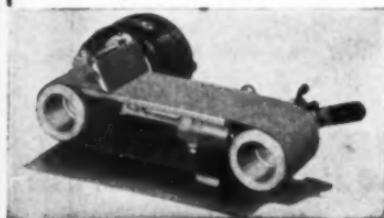
*Send for details—5-day FREE TRIAL OFFER!*

**Luma Electric Equipment Co.**  
Dept. H—Main P. O. Box 132, Toledo, Ohio



sides. For the anodes of the side busbars a semi-circular pattern is recommended; or the ordinary flat anodes may be employed. It is claimed that because of the simple design and the smaller amount of lead needed, these tubular anodes cost less than the regular flat ones.

### AN INEXPENSIVE ABRASIVE BAND GRINDER



*"Built Like A Machine Tool"*

The Hormel-M Grinder is sturdily built with a supporting leg under the grinding table to eliminate vibration and tipping due to pressure on belt. Ball bearing throughout, equipped with Atemite lubrication, complete with grease gun.

*Write for illustrated folder on this and other styles and sizes.*

**WALLS SALES CORP.**  
96 Warren St., New York, N. Y.

## Severance Heavy Duty Countersinks

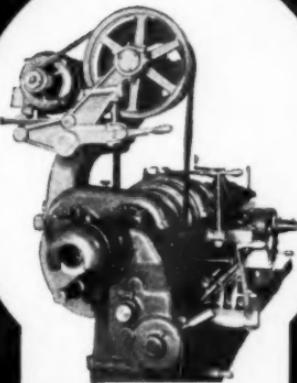


A new heavy duty type of "Chatter - less" countersink has been developed by Severance Tool Mfg. Co., 1510 East Genesee Ave., Saginaw, Mich. It is claimed to overcome the chattering often encountered with countersinks, especially those made from drills, with cutting teeth equally spaced regardless of the number of teeth. The makers emphasize that if countersinks are ground to cut freely, they are prone to chatter and leave the seats serrated. If ground to overcome this chatter, they heat up and cut slowly due to lack of clearance.

It is said that these difficulties have been overcome through a special design of cutting teeth—not alone by staggering of the teeth but by variation of the angle of the tooth face as related to the axis of the countersink. As a result, ample clearance can be provided to assure maximum cutting speed, yet when depth of cut is reached, the countersinks can be withdrawn instantly, leaving smooth, chatter-free seats. It is stated that the seats compare quite favorably under ordinary conditions with commercially ground seats. Where still smoother seats are required, the countersinks may be engineered individually to provide it. In fact, they have been used on some applications to eliminate grinding and lapping operations.

Demand for heavier driving facilities to utilize the full cutting capacity of these countersinks has prompted adoption of the Glenzer Utility sleeves in conjunction with larger shanks having a tang drive. The shanks are straight so they may also be used in standard drill chucks and are adaptable for use in portable drills, drill presses, lathes, screw machines, etc.

## The Keyhole to Greater Production and Profits



### TORQ DRIVES

open the door to increased production — up to 25% or more—easily installed, they become an integral part of the machine—coupling increased flexibility and efficiency with a marked reduction in operating costs, TORQ DRIVES will bring your equipment up to modern standards of performance.

- Variable Belt Tensioner
- All Steel Welded Column
- All Parts Fixture Machined and Bored
- Rigid Construction
- Self Aligning Ball Bearing Housing
- Neat Appearance
- Easily Installed

*Write today for bulletins giving complete information.*

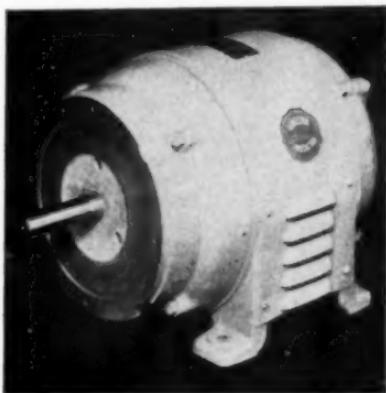
**The Torq Electric Mfg. Co.**  
6606 Carnegie Ave. Cleveland, Ohio

### End Shields for U. S. Motors

The U. S. Electrical Motors are now available with unimount end shields. These have a flat surface to facilitate the mounting of pumps and other directly driven equipment and for mounting magnetic brakes. They may be assembled on either end of motor and can be used to mount a footless motor to a machine frame if desired.

The shields may be obtained in a number of standardized outside diameters, mounting machine fits, and bolt

circles. They are also available unmachined which allows the user to machine the mounting dimensions to suit his particular unit.



### PULLING SYSTEM

**Capacities 5 to 40 TONS  
For PLANT MAINTENANCE**

The safe, efficient way to remove and replace bearings, gears, wheels, shafts, pulleys, etc.

**OTC GRIPOMATIC PULLERS**  
(with patented grip) prevent slipping, avoid damage, simplify work in close quarters.

**SPECIAL PULLERS** designed for special needs.

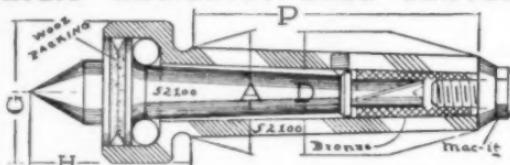


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**OWATONNA TOOL CO.**

355 CEDAR ST. OWATONNA, MINN.

### RIGID RESILIENT BULL CENTER



**Rigid Tool Holder Co., 2,000 Witherell St., Detroit, Michigan**

A disappointed buyer is slow in paying for his disappointment; while we have never yet lost a dollar, on a purchase order; or a customer that we know of; and seldom send out a "Please remit". But we are real cranky, about good work, and good material. The best is none too good. Excellence in Designing and Manufacturing is Excellence in Advertising.

*All Morse tapers carried in stock.*

Unimount end shields eliminate the necessity of an adaptor, save mounting time, provide Uniclosed Drip-Proof protection for the motor, conserve space, and harmonize with both the motor and the application. U. S. Electrical Motors, Inc.; Dept. 65; 80-34th St.; Brooklyn, N. Y. will gladly send full details.

### K. O. Lee Presents New Arc Welders

K. O. Lee announces a new line of arc welders consisting of three models —150 amp., 200 amp., and 250 amp. These embody the characteristic design of the former models, having a round,

streamlined case, with an oval dome, and open ventilation at the top. The number of heat taps on the 200 amp. model have been increased from 10 to 14, and on the 250 amp. model from 10 to 16. For heat taps, straight holes with spring pressure plugs are used, which assures good contact because the plugs wipe the holes clean as they are pushed in. The welders are ventilated with cool air entering through the open bottom. Upward movement of air is unimpeded as a greater open area is allowed at the top than at the bottom. The manufacturer compares this construction to a smoke stack, affording a natural draft.

A voltmeter is also available on all models for those who desire it. It is claimed that this is quite essential because many times the line voltage is not great enough to give good welding operation. A two wheel hand truck attachment is also available where it is necessary to transport the welder from one part of the shop to another. Four casters are regularly supplied, but the hand truck attachment has advantages

where the floor is rough or when it is necessary to move the welder far.



For further information, write K. O. Lee & Son Co., Aberdeen, S. D.

## Does Your SURFACE GRINDER Embody these Modern Features?



Close tolerances — individual motors with variable stepless speed control on each spindle — automatic or manual vertical spindle feed — variable work table speed — maximum wheel life — low operating cost.

*These are just a few of the many features of the Type SG-1 Surface Grinder. Write today for further information.*

**Bergram Mechanical Engineering Co., Inc.**  
33 Whiting St., New Britain, Conn.

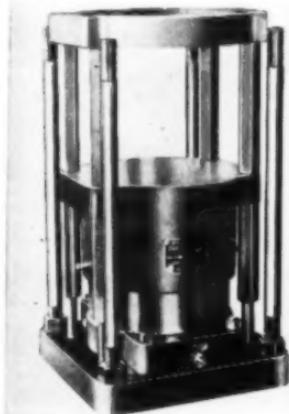
## Pneumatic Die Cushion With Slug Clearance

A new model CS pneumatic die cushion has been added to the line now manufactured by the Dayton Rogers Mfg. Co., 2830 South 13th Ave., Minneapolis, Minn.

The new design lends itself to a wide application of installations on various inclinable and straight side presses where it is necessary for the slugs, scrap or blanks to pass through the die proper including bolster plate and pin pressure pad. This cushion design allows the draw ring pressure pins to pass through the bolster plate and come

The pin pressure pads can be provided with openings of practically any size up to the size limit of the cushion for slugs, or blank clearance. These openings, of course, allow the slugs, scrap or blanks to fall through the pin pressure pad clear, clearing the top of the die cushion cylinder. This design can also be used to advantage on various compound dies for controlling the stripper plate action.

The cushions are now made in five sizes, from 6" to 14", in 2" steps, having a drawing capacity of from 2" to 6". No surge tanks are necessary in drawing shallow shells up to 1 1/4". This cushion equipment can be attached directly to the bolster plate or provided with suspension rods for press bed installation. Each cushion comes complete with the necessary regulator and gauge, which automatically determines the air pressure used in all cases and maintains pre-determined constant pressure on the cushion cylinder under working conditions at all times.

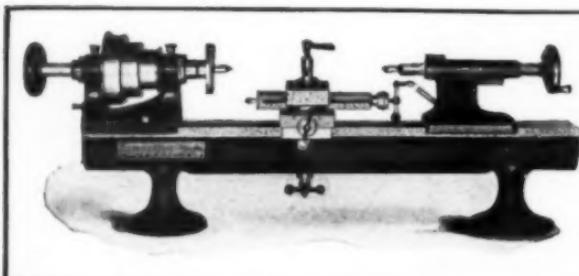


to rest on the top of the pin pressure pad, allowing the pin pressure pad to bump against the under side of the bolster plate.

## CP Offers New Universal Electric Drill

In presenting this new streamlined tool for metal or wood drilling up to 1/4" capacity, Chicago Pneumatic Tool Co. emphasize that it was designed particularly for compactness and unusual resistance to wear and abuse.

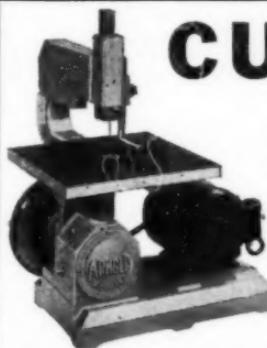
The motor is very powerful and has unusually high torque. It is available in three speeds. The gear case is simple and contains but one pair of helical gears. All bearings are ball bearings mounted in steel inserts. Housings are rugged enough to resist accidental abuse. A bump on the handle cannot



## WADE Bench Lathes

Economical, accurate, enduring for turning, drilling, threading, grinding, milling and screw machine operations.

**Wade Tool Co.**  
Waltham, Mass.



# CUT 50%

Efficient, accurate, easy to operate and extremely fast, the ARMGLO Die-Filing Machine slashes the cost of sawing, filing and lapping dies, gauges, templates and cams.

It is adapted for any and all kinds of die-making. Overarm is constructed so that file and saw attachments can be interchanged with little time and effort. Hold down fingers are attached directly to overarm. Working surface of table, which tilts three directions, is entirely clear. New type chuck construction holds both saws and files. Screw adjustment makes changes easy and fast. Soon pays for itself through savings which it makes possible.

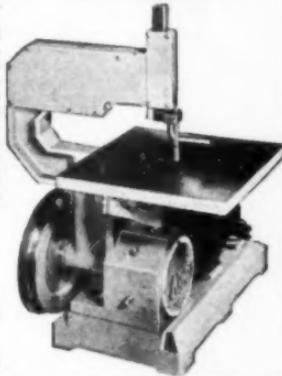
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**ARMGLO COMPANY**

3520 W. Pierce Street Milwaukee, Wis.

Manufacturers of Manual and Automatic Resistance Welding Production Equipment and Belt Surfacing Machines.

**FROM YOUR  
DIE-MAKING  
COSTS  
with this  
ARMGLO  
DIE-FILING  
MACHINE**



# AYOUT FLUID



Used by many leading industrial concerns.

*Preparing  
the Tool &  
Blank Surface  
for Layout*

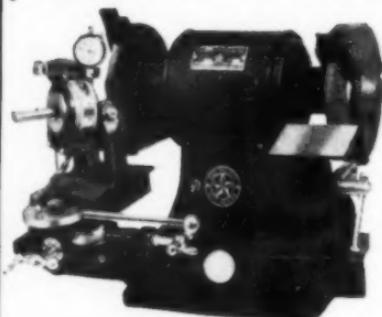
**By  
DAYTON  
ROGERS**

Better than the old copper sulphate method because the scribed lines have a pronounced contrast against the dark background — relieving eye-strain and allowing the workman to work accurately and easily to the desired layout. May be used to advantage on brass, aluminum, stainless steel, tin, copper, etc. Unnecessary to polish surface — simply wipe fairly clean and brush on — DRIES INSTANTLY.

Free sample if you request it on your business letterhead.

**DAYTON ROGERS  
MFG. CO.  
Minneapolis, Minn.**

## Precision Drill Grinder



Simple to operate—dependable—speedy—this Precision Grinder will enable you to produce perfect joints on standard twist drills in sizes from No. 41 (.096) to  $\frac{3}{8}$ " (.625).

*Send today for more details.*

**Star Machine & Engineering Corp.**

Division Star Electric Motor Co.  
Bloomfield, - - - New Jersey

distort the bearing alignment since there is no connection between the handle and the bridge supporting the rear armature bearing. The air intake



## VISE

For  
DRILL  
PRESS

With and Without Jig Attachments  
6°, 9° and 12° Jaws

Often used  
on Miller,  
Shaper or  
Planer.

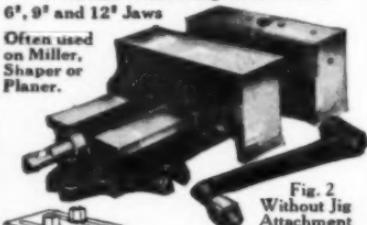


Fig. 2  
Without Jig  
Attachment

*Send for Circulars*



Fig. 3  
V-Jaw Holds  
Round Work  
Vertically or  
Horizontally.

**THE GRAHAM MFG. CO.**  
79 Willard Ave.,  
PROVIDENCE, R. I.

is on the ends of the handle where it will not be covered by the hand or pick up dirt and chips. There are no screens and the casting is perforated with very small holes. The switch is an oversize two-pole enclosed mechanism with die cast, close fitting trigger attached. The simplicity and large size of the mechanism should assure unusually long life.

This same tool can also be supplied as a Screw Driver for No. 8 wood or 3/16" machine screws; also, as a Nut Runner for 3/16" nuts or bolts.

Address Chicago Pneumatic Tool Co., 6 East 44th St., New York, N. Y. for further details.

## Centerless Grinding

(CONTRACT WORK)

**PRECISION, FINE FINISH,  
LOW COST**

*May we quote on your specifications?*

**THE HEIM COMPANY**  
Fairfield, Connecticut

## Marquette Announces New Arc Torch

Marquette Mfg. Co. of Minneapolis, Minn., introducing their new torch explain that A. C. and D. C. arc welding users have long been handicapped by lack of a suitable attachment for doing the many heating and welding jobs that demand an independent source of heat such as supplied by the gas torch.

With the Marquette Arc Torch and A. C. welding current, that difficulty has been largely overcome. It is now possible



to do general heating jobs; preheating; welding of aluminum, bronze, copper, pot metal, German Silver and other non-ferrous metals; braze; solder; apply hard surfacing paste and in general do most of the jobs heretofore left for gas welding equipment.

It is asserted most of these jobs can be performed as successfully as with gas, and in some cases more successfully, and they can be done at a lower cost than with gas equipment.

The Marquette Arc Torch, it is said, actually operates on less current than when welding with the metallic arc and can be used with any A. C. machine. In many cases the Arc Torch can be operated at no added cost so far as current is concerned, because in many cases owners are not yet using the full share of current to which their minimum charge entitles them.

The Torch is claimed to be ideal for welding aluminum in every size and shape. Its soft, hot, easily controlled flame is especially suited to this application. It has been found by aluminum foundries and factories to be one of

**NAILS · RIVETS · SCREWS**  
MADE TO ORDER IN ANY METAL

**HASSALL**  
*Products*  
CLAY & OAKLAND STS.  
BROOKLYN, N.Y.

*Write for  
Illustrated Catalog*

**New  
Catalog  
Will Be  
Ready Soon.**

HOW MUCH  
**COMFORT**  
CAN YOU BUY?



ROOMS  
from \$1.50  
WITH  
BATH  
\$1.75  
also  
WEEKLY  
RATES

• A wonderful bed, a clean, quiet room, pleasant, efficient service, and a friendly atmosphere — these are what you get, and all you pay for, at the Madison-Lenox. No frills—just genuine comfort and consequently, genuine economy. An excellent location, with garage nearby.

VERNON W. MCCOY, Gen. Mgr.

Detroit

**HOTELS** MADISON AVENUE AT  
**MADISON** and **LENOX** GRAND CIRCUS PARK

the most economical and successful methods yet devised.

When frames, bumper brackets and other parts are to be heated for straightening the Marquette Arc Torch is especially adaptable. Preheating of light castings can be accomplished quickly and efficiently without defacing machined surfaces.

Body metals and soft solders can be run to suit the needs and desires of the job. Accurate control of heat makes

possible a soft flame ideal for this type of work.

Hard solders such as Easy-Flo, Sil-Fos, and other silver solders can be handled with success. This particular application to the repair of copper, brass, monel metal and all ferrous metals will find a ready application in such industries as:—Automotive, Aviation, Refrigeration, Sheet Metal and Plumbing and Heating Shops.

The Torch is packed complete with two 10' cables—2 sets each of  $\frac{3}{8}$ " and  $\frac{1}{4}$ " Marquette Carbons—2 -  $\frac{1}{4}$ " Carbon Adaptors and a set of 2 - Copper Terminal Terminal Lugs besides the two regular Marquette Taper Jacks and a complete set of instructions.

## COMPARE!

### Index No. 39 High Speed VERTICAL MILL

Compare this modern mill to your machine. You'll find that this mill handles 90% of work done on machines costing five times as much.

A thoroughly modern high speed vertical mill—indispensable on jigs, dies, tools, patterns. Mills, drills and bores on straight or angle work. Uses  $\frac{3}{32}$ " to  $\frac{1}{2}$ " end mills in tool steel. No. 9 B. & S. taper in ball bearing spindle— $\frac{3}{4}$ " travel.

Milling capacity  $6 \times 16 \times 12^2$ .

Soon pays for itself through savings which it makes possible. Let us prove it in your plant.

Write for full details.

**BLANK & BUXTON  
MACHINERY CO.**  
Jackson, Mich.



## MOORE'S SMALL SET SCREWS

Headless 2-56 to 1/2-13

Square Heads 6-32 to 3/8-16

QUALITY — Unsurpassed

QUANTITY — Capacity large enough to fill any order.



**GEORGE W. MOORE**

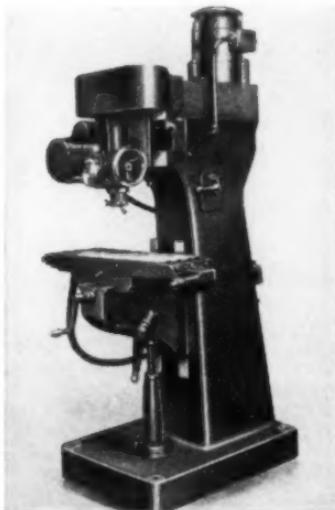
44 FARNSWORTH ST. BOSTON, MASS.

*For 58 years manufacturers of quality screws.*

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speed of slide in both directions.

Hand feed and five rates of automatic down feed are provided to the spindle



sleeve. Feeds are independent of the reciprocating travel of the spindle head.

Drive is by a two-speed vertically mounted flanged-fitting motor. Two drives are provided by vee-ropes passing over spring-loaded jockey pulleys. One drive gives a choice of six speeds to the cutter spindle. The other drive, to a worm reduction box mounted inside column, provides a choice of four

rates of reciprocating travel to the spindle head for each spindle speed.

Maximum keyway cut, automatic crank drive is given as  $\frac{3}{4}'' \times 5''$ —with automatic crank drive and table adjustment,  $\frac{3}{4}'' \times 20''$ . Maximum depth of keyway cut is  $2\frac{3}{4}''$ .

Address Reed-Prentice Corp., Worcester, Mass., for full details.

## At Last!

### A Positive, Roll Grip Keyless Drill Chuck . . .

*Check these advantages:*

- 1—Drills will not slip.
- 2—100% keyless.
- 3—The heavier the load, the tighter it grips.
- 4—Ends damaged drill shanks.
- 5—Yes! The tapered shanks are tempered.
- 6—Slight twist of the wrist releases drill.
- 7—Scientifically designed, ruggedly constructed.
- 8—Runs true—and remains so.
- 9—Unconditional one-year guarantee (baring abuse)

*Send for detailed folder.*

**Motor Tool Mfg. Co.**  
12280 Turner Ave.,



Detroit, Mich.



CLOSED

TRADE



CLOSED  
MARK



Offset Type

OPEN

## CONTINUOUS HINGES

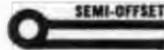
All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

**AUTO MOULDING  
& MFG. CO.**

2326 S. CANAL ST  
CHICAGO

**SPECIFICATIONS:**  
Open Width  $\frac{7}{8}''$  to  $6''$   
Gage Material .040 to .125  
Pin Diameter .101 to  $\frac{3}{8}''$   
Lengths to 120"



## Hannifin Takes Over Rock River

The Hannifin Mfg. Co. of Chicago has recently acquired the business of the Rock River Machine Co., of Janesville, Wis. The Rock River machine line will be continued, but with improvements and refinements. Engineering, sales and manufacture will be carried on in the Janesville plant.

The line will continue to include all types of vertical and horizontal punches and shears, combination punches and shears, splitting shears, pyramid and pinch type bending rolls, bulldozers, bending and straightening machines, stake riveters, etc. It is reported that the addition of new related products is also contemplated.

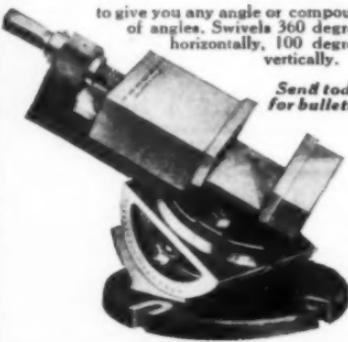
Obviously, the Rock River Machine line complements the internationally known line of Hannifin Hydraulic Riveters as well as Hannifin "Allen" Pneumatic Riveters, which are used so extensively in modern high production manufacturing plants.

As a further indication of the growth and expansion of the Hannifin line, it will be noted that a new department has just been established in the Hannifin plant in St. Marys, Ohio, for complete fabrication of welded machine frame structures. In addition to flame cutting and welding equipment, a large furnace for stress-relieving has been

## The New Britain Universal VISE

to give you any angle or compound of angles. Swivels 360 degrees horizontally, 100 degrees vertically.

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NEW BRITAIN TOOL & MFG. CO.  
NEW BRITAIN, CONN., U. S. A.

### "ALNOR" Velometer An All Purpose Air Velocity Meter —Instantaneous, Direct Reading.



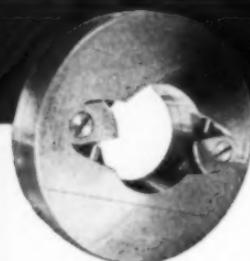
Measures total and static pressures as well as velocities.

*Write for catalog*

ILLINOIS Testing Laboratories, Inc.  
150 W. Austin, Chicago

## for your lathes

## SENECA FALLS Automatic WORK DRIVER



Self Centering... Quick Acting... No Slip. Attaches to any chuck plate or spindle. Provides a slip-proof, balanced drive reducing chatter. Handles rough forgings or turned pieces—straight or taper. Eliminates dogging time. Reduces tool breakage. Write for details and size range.

SENECA FALLS MACHINE CO., 314 Falls St., Seneca Falls, N. Y.

## CHATTERLESS COUNTERSINKS



We also offer a complete line of Midget Milling Cutters, ground by hand from the solid after hardening. They do a faster, cleaner job than rotary files, last longer and can be reground repeatedly. Unlimited forms, shapes, helix angles, etc., are readily obtainable. Write for full details.

Severance countersinks are designed to take heavy cuts and at the same time produce an amazingly smooth seat. The Cutting teeth are so arranged as to give a shearing cut and make chatter almost impossible. Special countersinks made in various combinations of angles, diameters, lengths, ball nose, double angle, and shank types and sizes.

Submit your problems with full particulars to our engineers or write for Catalog No. 12.

**Severance Tool Manufacturing Co.**  
1510 East Genesee Ave. Saginaw, Mich.

## MARSCHKE Heavy Duty Grinders and Buffers



A catalog showing seventy different grinder and buffer specifications will be sent promptly upon receipt of request.

Considering only such major specifications as weight and sizes of motor, wheels, bearings, spindle diameters, you'll find a lot of other machines to compare with MARSCHKE ELECTRIC GRINDERS and BUFFERS.

But do not overlook the less spectacular and more important items of material specifications, workmanship and particularly the provisions for lubrication, bearing and motor protection, and above all the details of wheel guard construction.

Let us tell you about the details accounting for the superiority of MARSCHKE GRINDERS and BUFFERS.

**Vonnegut Moulder Corp.**  
1805 Madison Ave., Indianapolis, Ind.



## Tapping As Fast As You Can Drill . . .

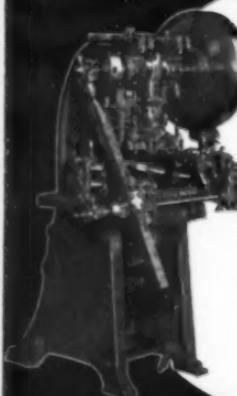
with the A.M. Sensitive Tapping Machine . . . from the smallest and finest up to  $\frac{3}{16}$ " diameter in steel and iron—and up to  $\frac{1}{2}$ " in softer materials. A modern unit that within its capacity, will take all the punishment intense production can inflict.



*Write TODAY for  
this sure solution of  
your small  
tapping  
problems.*

**A. MUEHLMATT DIVISION  
OF  
THE HAMILTON TOOL CO.  
HAMILTON, OHIO**

## LITTELL FEEDS for COIL STOCK



**LITTELL** Roll  
Feeds economically  
handle coil stock.  
Can be mounted on  
different styles and  
makes of presses.

**LITTELL** also  
makes Feeding and  
Straightening Ma-  
chines, Reels for  
Coil Stock, Scrap  
Cutters, Oilers,  
Assembly Ma-  
chines, Air Blast  
Valves and Nozzles,  
and Safety Pickers.

Ask for Bulletin  
SEC. 41.



**F.J. LITTELL MACHINE CO.  
4153 RAVENSWOOD AVE. CHICAGO ILL.**

installed, making it possible to produce all-steel welded frames in accordance with most generally approved and modern practice. These additional facilities are said to have been made necessary by the large demand for Hannifin Hydraulic Presses and Hannifin Engineered Hydraulic Machinery.

### Kennametal Milling Cutters

McKenna Metals Co., 135 Lloyd Ave., Latrobe, Pa., announces a new series of milling cutters equipped with Kennametal-tipped blades, which have been developed in cooperation with the McCrosky Tool Corp., Meadville, Pa.

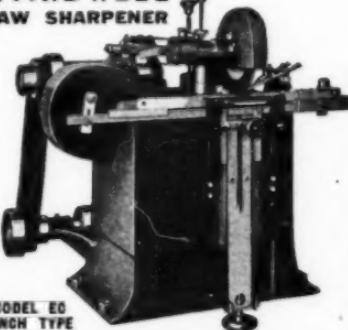


The fast machining speeds and high resistance to wear found in Kennametal-tipped single point cutting tools are also characteristic of the new milling cutters. In the job illustrated, the 7" diam. standard McCrosky Jack-Lock Shell End Mill tipped with Kennametal grade KM is milling an S. A. E. 4150 steel forging that was heat-treated before machining to a hardness ranging from 28 to 32 Rockwell C. The cutter is run at 92 r.p.m., said to be approximately five times as fast as was possible with a cutter equipped with high speed steel blade. The feed is  $3\frac{1}{8}$ " per min. and the depth of cut .125". An average of 160 faces were

milled before regrinding was necessary.

The new series comprises nine standard sizes in each of the following types of cutters:—medium duty face mills, heavy duty face mills and shell end mills. Incorporated in these milling cutters are exclusive features developed by McCrosky engineers which are asserted to be particularly advantageous when using blades tipped with the hard carbide material, Kennametal. The Jack-Lock Wedge locks the blade with extreme rigidity and may be locked and unlocked without pounding, thus avoiding damage to the blades. In addition, the special adjusting screw in back of each blade permits fine and accurate forward adjustment that holds to a minimum, the amount of expensive carbide material which must be removed to align all blades when regrinding. Blades may be moved forward as little as .002 of an inch. These design features are shown in the 18 blade facing mill illustrated.

**WARDWELL**  
SAW SHARPENER



MODEL EG  
BENCH TYPE

**Automatically Sharpens Hack,  
Band & Circular Saws**

with teeth as fine as 32 to the inch,  
at a speed of 30 to 75 per minute.

WRITE FOR CIRCULAR

**The Wardwell Mfg. Co.**  
3165 Fulton Rd. Cleveland, O.

The McKenna Metals Co. will gladly furnish complete information on request.

### Metal Stripping

Metastrip is a new product for stripping of baked enamels, varnishes, lacquers, paints, japan, and the new synthetic finishes from steel, zinc, alloys, etc.

Maintained at a temperature of 190/200 degrees F., the work is immersed in Metastrip for about two minutes. Then it is rinsed in hot water, resulting in a clean, bright metal surface.

It is claimed that Metastrip does not injure the hands of the operator and that it is non-inflammable.

A bulletin giving complete details may be had by addressing Surface Finishing Products Co., Westville P. O. Box 2954 No. 14, New Haven, Conn.

### Special Anti-Mushrooming Anti-Chipping Heat-treat

**Oversize Shanks ▶**

**Exclusive  
Knurled Back ▶**

**Exclusive  
Thumb Grip ▶**

**Broach-  
Rounded ▶**

**Corners**

and  
a

complete  
line of  
**Marking  
Devices**

Write for Price and  
data Bulletin No. 113-12 A

**NEW METHOD STEEL  
STAMPS, Inc.**  
149 Joseph Campau, Detroit



## Ammco Bearing Boring Machine and Small Bore Hone

The Ammco bearing boring machine for sizing and finishing con-rod and main replaceable bearings has been



added to the line of tools and equipment manufactured by the Automotive Maintenance Machinery Co., North Chicago, Ill.

It is designed so that insert bearings within a range of  $1\frac{1}{8}$ " to  $3\frac{1}{2}$ " in di-

ameter, up to 4" in length can be accurately bored to any size depending upon the size of the crankshaft bearings. Machine has balanced flywheel for smooth operation and fine finish of bearings. It has a heavy boring bar  $1\frac{1}{2}$ " in diameter, supported in 5" of bearing surface. Power or hand operated.



This machine can also be used for accurately boring sleeves, bushings, and small cylinders, as well as split bearings.

Another useful Ammco tool is the small bore hone for piston pin fitting, honing spindle bolt bushings, water pump bushings, steering sector bushings, honing brake cylinders and other small bores.

This hone has automatic centering cone, push expansion knob and stop collar. Automatic centering cone maintains perfect alignment and permits

## WHEN BUYING CUTTERS

*look for the name*



As Cutter Specialists since 1919 we are able to offer the highest *quality* and *service* at *attractive prices*.

Write today for prices.

Few Territories Open.

**QUALITY TOOL WORKS**  
WAUKEGAN, ILLINOIS

## World's Lowest Cost STAMPINGS in small or large lots

**Special:** Total die and stamping cost for 1000 flat blanks most any shape up to 10 sq. in. **\$25.00.**

We can save you money on all types of sheet metal parts in small quantities.

All types of dies designed and built.

**SOUTHERN PRODUCTS**  
Dept. H10 INDEPENDENCE, MISSOURI

## NICHOLSON CONTROL VALVES

are made in two, three and four-way types for air, oil, water, steam, gas, etc., pressures to 5000 lbs. Style E is a general purpose valve for pressures to

300 lbs. Various metal combinations to suit any medium. Style J is for air and oil only, pressures to 125 lbs. Style H is a balanced hydraulic valve for pressures to 5000 lbs. We also manufacture foot, solenoid and motor-operated valves.



Style J



Style E



Style H

*Bulletins on request.*

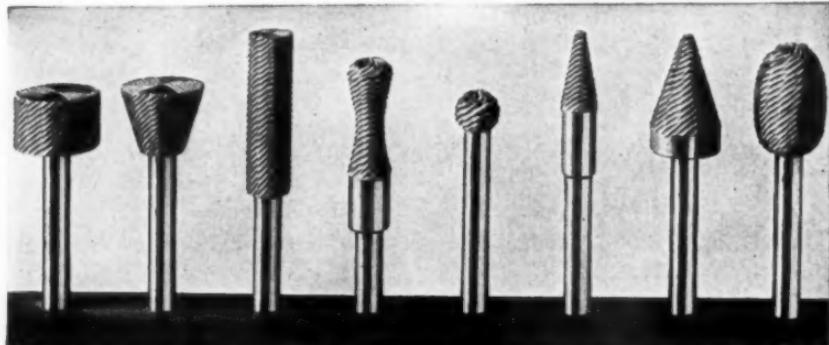
**OTHER NICHOLSON PRODUCTS:** Mandrels, Arbor Presses, Flexible Couplings, Steel and Stainless Steel Floats, Steam Separators, Steam Traps, Air Separators, Air Traps, Air Vents, Etc.

**W. H. Nicholson & Company**

117 OREGON STREET

WILKES-BARRE, PA.

## Ford Hand Cut Rotary Files



Just a few of the many standard shapes which are carried in stock

Send for catalog and full information

413  
PERSHING AVE. **M. A. FORD MFG. CO.**

DAVENPORT,  
IOWA

grinding each boss separately . . . Stop collar can be set to limit expansion to any desired diameter, and makes it easy to grind all holes to same size when desired . . . Push expansion knob leaves both hands of mechanic free to hold piston, bushing or cylinder, and prevents overgrinding. The tool is fast and gives perfect fit, full bearing surface and mirror finish.

No. 1 Grinder has a range of from  $47/64"$  to  $1\frac{5}{16}"$ . No. 2 covers  $1"$  to  $1\frac{5}{8}"$ .

### Bremil Hand Shears

Powerful compound leverage and a rugged all-alloy steel construction that can "take it" are distinguishing fea-

tures of the Bremil portable hand shears. Even the bolts are of special alloy steel. The special alloy cutting blades are removable, and special blades are available for cutting tough stainless steel.



The No. 1 shear is claimed to cut up to 11 gauge with ease, and to do it consistently without springing the jaws. This gives a range well within the requirements of the average sheet metal worker. It weighs 22 lbs. and can be used on the job or on the bench.

It is asserted that the No. 2 mill type shear will operate continuously and safely without overstressing any of its parts, regardless of the man-power exerted on the handle. It is said to operate successfully on  $1/4"$  .40 carbon stock. Weight is given as 28 lbs.

Address Bremil Mfg. Co., 1720 Pittsburgh Ave., Erie, Pa., for a bulletin giving full details.

## SCHAUER Speed Lathes

Timesavers for Your Plant

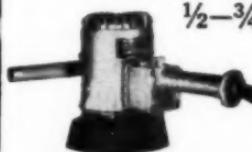


Speedy, economical tools for finishing, lapping and polishing small parts. Hand or foot operated collet, sizes from  $1/64"$  to  $1\frac{1}{4}"$ . Hand, foot or air operated 3-jaw chucks. 1,  $\frac{1}{2}$  or  $\frac{3}{4}$  h. p. A. C. 2-speed motor.

Send today for circular 380

**SCHAUER MACHINE CO.**  
2064 Reading Road, Cincinnati, O.

## CUTS GRINDING COSTS



$1/2$ — $3/4$ —and MORE

HEAVY DUTY

3 Phase  
60 Cycle  
No Brushes

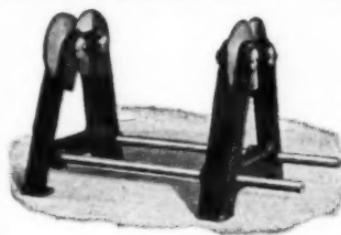
**GASTON POWER TOOLS**  
2655 W. 95th St., Evergreen Pk. III.

## Excelsior Stainless Steel Sheet Polishing Machine No. 27-H

Polishing Stainless Steel Sheets by the Manufacturer are now available on a paying basis by utilizing the Excelsior simplified patented process.

**EXCELSIOR TOOL & MACHINE CO., EAST ST. LOUIS, ILLINOIS**

# ANDERSON Improved Balancing Ways



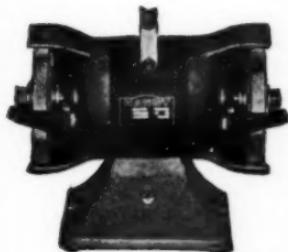
Every shop handling rotating parts needs this simple, sturdy, dependable device for balancing, straightening and truing operations. Saves time and trouble and assures better work.

Four chilled iron discs rotate with minimum friction on sensitive special bearings, giving a prompt, sure indication of whether or not the work is in perfect balance.

*Write NOW for full information.*

Swing	Greatest Distance Between Standards	Capacity in lbs.
20 in.	20 in.	1,000
40 in.	30 in.	2,000
60 in.	30 in.	2,000
72 in.	66 in.	5,000
96 in.	88 in.	10,000

**ANDERSON BROS. MFG. CO., ROCKFORD, ILL.**  
1907 Kishwaukee St.



## STURDY BUILT-- for Long, Hard Service

A complete line—6" to 12"; Bench and Pedestal Types; All Heavy Duty, Ball Bearing; Price range, \$20.50 to \$175.00.

1 YEAR GUARANTEE.

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BALL BEARING **GRINDERS**

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**The M-B "Utility" Pneumatic**  
**Grinder. Model U.—T. R.**  
**A 60,000 R.P.M. Unit**



**Steel Housing (For Safety)**

A WORTHY COMPANION TO OUR  
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 S. S.—S. R.

SPECIAL GREASE SEALED BEARINGS  
 NO LUBRICATION REQUIRED.  
 AN ABUNDANCE OF POWER.  
 OTHER MODELS, ALSO AIR LINE FILTERS  
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 LUBRICATORS.

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**DIES, JIGS AND FIXTURES**  
**LARGE OR SMALL**

We can handle your Jig Boring jobs at  
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 & Whitney Jig Borer. Quick service.

Have been delivering satisfaction since  
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**QUALITY TOOL & DIE CO.**

*Ray W. Rice, Manager,*

401 N. Hobie St.,

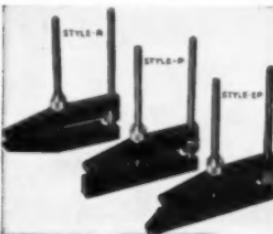
Indianapolis, Ind.

## Hercules Toolmakers' Parallel Clamps

Simple, strong and practical, these new Hercules parallel clamps should appeal to tool makers. The upper knurled nut permits rapid opening and closing of the upper jaw. The rear hexagon nut is drilled for pin or wrench and is said to permit the application of greatly increased clamping pressures.

Front end of upper jaw is tapered to permit convenient clamping under shoulders or in recesses.

Lower jaw is fully parallel in form,



and with no protruding screw head on bottom, it will lie parallel and will not tip.

The clamps are made of case hardened steel, mottle finished, in two convenient sizes and three different types.

Address Hercules Products, Fifth and Hooper Sts., San Francisco, Cal., for further details.

## Handling Small Parts at Monarch

An unusual method of handling the dozens of small parts that must be supplied continually to men on sub-assembly lines in shops where a variety of different units must be assembled in small lots, has been worked out by the Monarch Machine Tool Co., lathe builders of Sidney, Ohio.

Since lathes are usually assembled in groups of less than 25 units of one size and type at a time, no standard mass production method of constantly feeding the same parts to the same work bench day after day is possible. The conventional method of solving



such a materials handling problem is for the stock room to bring a supply of parts to each assembler and pile them up on his work bench.

Monarch, however, solves the problem with specially designed cabinets that serve both as delivery trucks and storage units. These parts-assembly trucks, loaded in the stock room with the supply of detail parts conveniently placed in handy compartments, are wheeled to positions alongside the workmen's benches in the assembly department and left there.

Besides, small items, such as pins,

washers, bolts and nuts, are kept in handy 6 x 6 inch bins on top of the cabinet-trucks where there is no danger of being damaged or mixed in with other items or rolling off and getting lost. Parts such as bearings that must be kept clean and actually kept clean, because there is a hinged cover on the top bins and all the compartments are thoroughly cleaned out each time the unit is re-loaded in the stock room.

The units are of all-welded sheet steel construction and consist of nine handy vertical compartments of different sizes, topped by twelve hori-

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Rotary Files  
ground from  
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hundreds of rotary files  
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## ULTRA-CHEX

### Precision Length Standards



#### NINE STANDARDS IN SET:

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 .250" - .300" - .500" - 1" - 2"  
 with or without optical parallel.

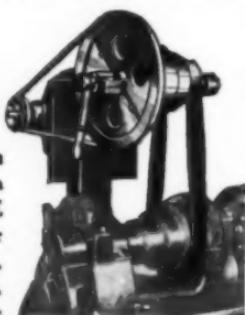
Ask for bulletin No. 135, which discusses many applications for Ultra-Chex for daily use in your shop.

Price as illustrated \$25.00, without optical flat \$19.50.

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 122 LAFAYETTE STREET, NEW YORK

## GUARANTEED FOR 5 YEARS

When you purchase a STEEGE Drive for your lathe, shaper, miller, etc., you're protected by our broad 5-year guarantee.



STEEGE Drives are easily installed—prices \$35.00 up—sent on 30 days' approval. *Let us send catalog.*

W. L. STEEGE MACHINERY CO.  
 (Our 23rd Year)  
 548 W. Monroe St., Chicago, Ill.

horizontal 6 x 6 inch sections. At the base is a 15 x 36 inch compartment 27 inches deep for extra large parts and storage of the sub-assemblies when they are completed. The units stand 4 feet high, and are narrower at the top than at the bottom so all levels can be seen from above.

### Automatic Release Clutches Added to Conway Line

A new series of disc clutches embodying automatic safety features has been added to the Conway line.

In one of these arrangements the clutch slips at a predetermined torque,



stopping the machine if an obstruction or excessive torque is encountered.

Another arrangement provides for slipping of the clutch as soon as an obstruction is encountered, but after a fraction of a revolution of slippage, the clutch disengages itself.

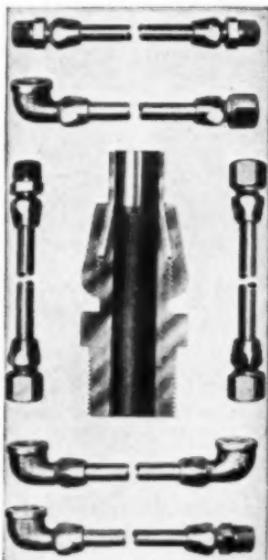
Additional features and functions may be added such as limit switches, acting directly off the clutch and disengaging electrical equipment controlling power on minor movements of the machine.

These new release and slip clutches may be applied to a wide range of machines and conveying systems in which an obstruction can cause damage to the machine, to the product or to the production routine.

Address The Conway Clutch Co., 1541 Queen City Ave., Cincinnati, O., for bulletin S-10.

### Superseal Connectors

Illustrated are a few of the new and widely used connectors made by the Superseal Corp., 300 Fourth Ave., New York City, for use with aluminum, brass, copper and steel tubing, etc. They are available in sizes  $\frac{1}{8}$ " to 2" in various adaptations and a wide range of lengths.



The effectiveness of this type of connector is attributed to the distinctive design of the superseal couplings, employing the exclusive compression joint, sealed both inside and outside with ends of the tubing flared to a 20 degree angle. This provides a long flare which assures a tight seal with the tubing wedged between the self-aligning compression nut and the fitting. The cutaway view clearly shows this long flare. Leaks or breaks are said to be impossible.

It is asserted that the sealed flare can be loosened and tightened any number of times without injury to the tubing. Another Superseal feature is the full inside diameter of both tubing and fittings. Actually, each fitting is a union in itself.



**SAVE  
Labor  
and  
Time**

Eliminate  
heavy lifting.  
Cut handling  
costs. Table

swivels and locks in any position. Can be varied  $15\frac{1}{2}$ " by slight foot pressure, leaving operator's hands free. Engineered and built by tool engineers, experienced in production of special machines, dies, jigs and fixtures for exacting requirements.

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**EFFICIENCY  
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QUALITY  
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In Plants From  
Coast to Coast.  
It will pay you  
well to find out  
why.

*Send for  
illustrated folder*

**FEDERAL PRESS COMPANY**  
ELKHART, INDIANA

## Universal Marking Device for Round Shafts

A universal marking device which permits marking directly on the O. D. of shafts, rods, etc., has been introduced by New Method Steel Stamps, Inc., 143 Jos. Campau St., Detroit. Designed for the optional use of solid or low cost individual type, the device consists of a type retainer and a guide holder.

As shown, the bottom of the guide holder is in the shape of a wide 'V', so proportioned that the sides of the V-guide will rest against virtually any round shaft, providing a support on both sides to align the type and insure clear marking on center.

The type retainer floats in the guide but its travel is limited by a pin in

the guide extending into an elongated hole in the type retainer. Type retainers thus cannot drop out of the guide,



yet have sufficient freedom of movement to rest directly on the shaft to be marked.

Individual type is retained in the retainer by means of set screws. To remove the type retainer from the holder, the pins are merely retracted against spring pressure by means of the knurled knobs shown.

A hardened and ground anvil is provided in the type retainers to prevent type from "sinking."

## Armglo Abrasive Band Finisher

The Armglo "Speedster" is a new, totally enclosed, dust collecting finisher.

It should be decidedly useful for sanding, surfacing, polishing and burring of castings, dies, stampings, die castings, moulded products and machine parts.



SOCKET HEAD CAP SCREWS      SAFETY HOLLOW SET SCREWS

## MADE OF ALLOY STEEL MILLED FROM BAR

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Or Write For Samples Today.*

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MACHINE PRODUCTS  
COMPANY**

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## KUTMORE HIGH SPEED E

Adjustable Hollow  
Mills with  
Twoway Microm-  
eter Adjustment

Cutting capacities  
up to  $2\frac{1}{2}$ ".

Ask for Catalog  
No. 12.



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837 Lake Ave., ROCHESTER, N. Y.**

## STACKBINS SAVE— SPACE

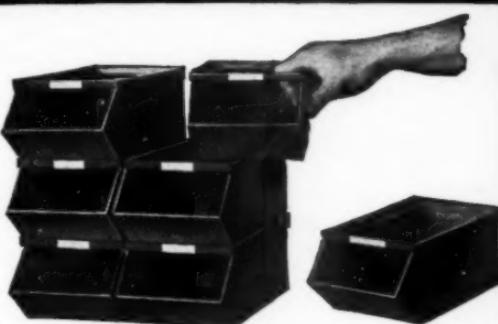
because they stack compactly to form units of exactly the right shape and capacity;

### TIME

by keeping parts instantly accessible—by eliminating waste hand motions;

### LABOR

by making order-filling or assembly work faster, easier, more efficient.



See how you can save all three with patented STACKBINS—write to Stackbin Corp., 55 Troy St., Providence, R. I., for complete information.

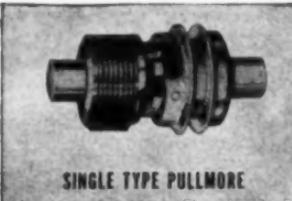
## STACKBINS

"STACKED AND STILL ACCESSIBLE"

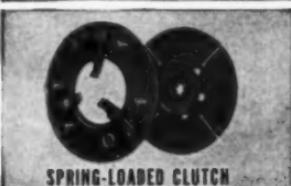
## Rockford Clutches for Industrial Equipment



OVER-CENTER CLUTCH



SINGLE TYPE PULLMORE



SPRING-LOADED CLUTCH



DOUBLE TYPE PULLMORE

### Pullmore Clutch

Are unexcelled for applications requiring a multiple disk clutch. They are used effectively as main drive clutch carrying all the load; auxiliary clutches controlling individual units; and in power take-off mechanisms to operate various mechanisms. Pullmore Clutches are available single and double types, for operation in oil or dry, capacities from 1 h.p. to 7 h.p. at 500 r.p.m.

### Rockford Clutch

Spring-Loaded and Over-Center, are ideal for use gasoline and diesel-engine driven equipment. The Over-Center Clutch remains in or out of engagement until changed by the operator, exclusive anti-friction roller cams make operation extremely easy; the Spring-Loaded Type operates like an automobile clutch. Corresponding sizes are generally interchangeable. Rockford Clutches are available with single or double drive plates, for operation in oil or dry in capacities up to 80 h.p. at 100 r.p.m.

## ROCKFORD DRILLING MACHINE DIVISION

of Borg - Warner Corporation

410 Catherine Street

Rockford, Illinois, U. S. A.

It uses 4" x 36" abrasive bands and the grinding table is 4½" x 7". The pulleys are 4" x 4½" and it occupies a bench space of 16" x 24". Weight is 70 pounds (boxed 100 pounds) and the driving motor is rated at 1/3 h.p., 60 cycles, 110 volts, 1750 r.p.m. Eccentric tension release makes belt changing simple and easy and the makers emphasize the smooth and vibrationless operation.

The Armglo speedster is a companion tool to the Armglo Die Filing Machine. The latter offers worthwhile cost

## - GEARS -

### Spur—Helical—Worm— Bevel—Miter, Etc.

We do broaching and all kinds of grinding.

We specialize in grinding hardened steel bushings, cam rollers, etc.

Prompt service and quality has retained a large list of customers for 25 years.

**TAYLOR MACHINE CO.**  
1919 E. 61st St., Cleveland, Ohio

saving possibilities on sawing, filing and lapping dies, gauges, templates, cams, etc.



Bulletins fully describing these and the Armglo line of welding equipment will be sent if you write Armglo Co., 3520 W. Pierce St., Milwaukee, Wis.

### Machining at 450 Brinell

In announcing Ryerson's new H. T. M. alloy steel in the December issue, it was inadvertently stated that the minimum nickel content was 20%. This was an obvious error and the figure should have been 2%. Our apologies to the readers and to Joseph T. Ryerson & Son, Inc.

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AUTOMATIC  
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**TIME—OIL—WORRY**

OPTOMATICS and LEVOMATICS maintain a constant level of oil in ring and ball bearings.

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WRITE  
FOR  
LITERATURE



## GOOD NEWS! for DIE MAKERS

Transfer Points Eliminate  
Guesswork in Die Making

There's no chance for error when you use transfer screws as markers in setting dies. Points are of uniform height above hex base. Six accurately made and hardened screws nest in a special holder with hex wrench tip. Made in  $\frac{1}{4}$ " to 1" diameters.

A TIME AND MONEY SAVER.

**HEIMANN MFG. CO.,**

**URBANA, OHIO**

## Bates Improves Numbering Machine

Most modern products are numbered for manufacturing and stock record purposes. Government equipment and parts must be numbered and sometimes this presents a problem for the manufacturer or supplier.

The improved Bates machine is compact and handy to use. It is said to permit more numbers within a given space and withstands hard service.

The makers emphasize that the improved machine for numbering from one to 999999 consists of nine parts and four screws as contrasted with 16 parts and three screws



for other types.

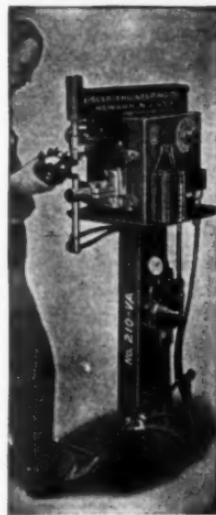
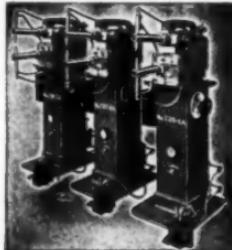
Numbers can be in condensed or extended styles as required. Sizes commonly used range from 1/32" to 3/8", although smaller or larger numbers can be furnished.

Parts are of shock-resisting, long service alloy tool steel and the numbers are finished by hand.

Address H. O. Bates, 251 N. Broad St. Elizabeth, N. J., for further details.



**Essex**  
The makers of a complete line of lubricating devices since 1901.  
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**ESSEX BRASS CORP.**  
2000 Franklin St., Detroit, Mich.



Investigate our NEW VERTICAL PRESS TYPE WELDERS. It's something NEW for precision work. CHAS. EISLER has over 50,000 SPOT WELDERS in daily use, from  $\frac{1}{4}$  to 500 KVA. We also make standard and special TRANSFORMERS of all kinds.

WE INVITE CONTRACT SPOT WELDING IN LARGE OR SMALL QUANTITIES.

A. C. Arc Welders from 100 to 400 Amps. Please write to us for more information. Kindly mention Hitchcock's Machine Tool Blue Book.

**CHAS EISLER**  
**EISLER ENGINEERING COMPANY**

762 So. 13th St. (Near Avon Ave.)

Newark, New Jersey

## Royle Develops New Cutter

A background of more than 80 years' experience in designing and making routing cutters should assure the efficacy of the new style "D" cutter. Made of high speed steel, the cutters are precision milled to scientifically established shapes, with close attention to the maintenance of proper centers and clearances.



Accurate milling and grinding automatic machinery of exclusive design is followed by careful tempering. The spiral flute is claimed to remove chips and shavings without clogging, leaving a clear path for the tool.

## BANISH



*Waste!*

### PRODUCTIMETERS

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Productimeters will record accurately your machine output . . . running time . . . idle time, and operating costs. Productimeters count strokes, revolutions, lineal units, bottles, cans, packages, etc., either mechanically or electrically. Also custom-built models for special purposes.

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All sizes have  $\frac{1}{4}$ " shanks and the size of cutter is the diameter of circle cut, stated in inch fractions. Sizes available range from  $3/16$ " to  $\frac{1}{2}$ ", with  $\frac{5}{8}$ " and  $\frac{3}{4}$ " cutters in the double flute type.

Address John Royle & Sons, Paterson, N. J., for full details.

## Additional Models of Leeds Foot Control Switches

Originally announced in the Series A only, two new types of Leeds foot control switches are announced by The Walton Co., 95 Allyn St., Hartford, Conn.



Where the current may have to remain on for considerable intervals, as in drill press operation, or where the operator must be free to move about while the machine is in operation, the Series E switch is required. With this type, the first exertion of foot pressure closes the circuit. The switch

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7 Types

Extension for  
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other types of  
lathe grinders,  
and portable  
hand grinders.

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**Wodack Electric Tool Corp.,** 4629 W. Huron St., Chicago, Ill.

## NEW... BETTER!

5 BIG IMPROVEMENTS

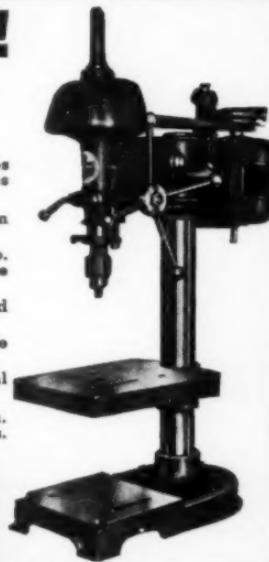
make the 15" Walker-Turner Bench  
Drill "tops" in its class

This new 15" Bench Drill Press—No. 950—has all the advantages of its popular predecessor... plus these 5 valuable new features available in no other drill press at the price:

1. Extra Big Table—10" x 12 1/4" instead of 10" x 9". Larger than tables on presses selling much higher.
2. All-Steel Pilot Wheel Feed with calibrated depth stop. Heavy, quadruple-rod construction for rapid, positive action.
3. 10 Speeds available through use of special multi-speed attachment. Four standard speeds.
4. Adjustable Spring Return on spindle. Soft yet positive action.
5. Takes No. 1 Morse Taper Drills through use of special adapter now available.

See it at your local Walker-Turner distributor's show room. Write for his name and new catalog containing all details. Walker-Turner Co., Inc., 1710 Berckman St., Plainfield, N. J.

**WALKER-TURNER**  
LIGHT MACHINES FOR INDUSTRY



then remains locked in the closed position until released by subsequent pressure on the pedal.

The Series A switches close the circuit only as long as pressure is applied to the pedal. In the Series K, this is reversed. Pressure on the pedal opens the circuit, making this a useful emergency normally controlled from some other point.

Developed for use with fractional h.p. motors driving all types of power tools, these switches free both hands for guiding the work or feeding the tools. A new six page bulletin gives full information.

### Lewellen Variable Speed Transmission

Maintaining uniform tension in winding strip metal, Lewellen engineers were faced with the problem of making the operation fully automatic. A special variable speed Lewellen trans-

mission with electrical control was developed. Here's the unique result:

The winding reel starts at its highest speed. As the strip of material on the spool increases in diameter, the control accurately reduces the speed of the reel to maintain uniform tension on the strip as it is wound. After the reel has filled and the unit stopped for removing and replacing it with a new core, the control reverses its position to allow the new reel to start again at



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New Design.  
High Grade.  
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Dealers - write for attractive proposition and new printed matter, just off the press.

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the maximum speed and decrease in speed as it is filled.

For further details address Lewellen Mfg. Co., 1065 E. 10th St., Columbus, Ind.



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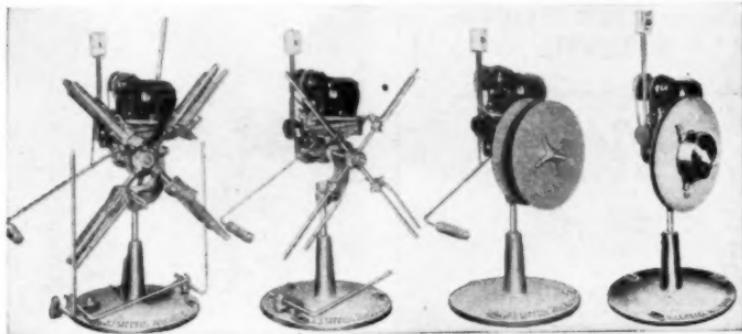


## Littell Reels for Light-Gauge Coils

A complete line of light-duty motor-driven reels and winder is announced by the F. J. Littell Machine Co., 4127 Ravenswood Ave., Chicago. They are for use with automatic punch presses, carrying light-gauge material in coils up to 300 lbs. The Reels are available

height, being fully equipped with anti-friction bearings.

Motor-driven reels are used for unreeing coiled stock into high-speed automatic punch press feeds. The Littell 3G type of reels pictured provide a continuous loose loop of material for the feeding equipment. Further details may be obtained direct from the manufacturer.



in four different sizes. Left to right. Fig. 1 is an automatic centering reel. Fig. 2 is a plain reel with arms. Fig. 3 is a plate type reel. Fig. 4 is a scrap winder.

The reels are fitted with adjustable brakes, Mercoid loop controls and are driven by  $\frac{1}{4}$  h. p. geared head motors through V-belt drives. Reels can be used for unreeling stock from right to left or left to right simply by switching the loop control arm from one side to the other. They can be tilted to any angle, and are adjustable in



### HANDY RACKS SAVE TIME and MONEY

Tremendous capacity between the knees and shoulders of a man's height and in small floor space. No stooping, stretching or back-breaking. Very valuable in connection with supplying stock to automatic screw or parts-machines.

30 days approval if you wish.

*Write today for details.*

**Wm. S. Yohe Supply Co.**  
503 Mahoning Rd. N. E., Canton, O.

## NIELSEN Heavy Duty *Live* *Centers*

*Write for  
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live centers*

Adapted  
for heavy  
duty work.  
Precision type  
ball and roller  
bearings assure  
maximum capac-  
ity for high speed  
production and long  
service.

**NIELSEN, INC.** LAWTON,  
MICH.

*Now Available*

# 3 NEW

BODY SIZES OF PRESS FIT BUSHINGS CONFORMING TO LATEST A. S. A. REQUIREMENTS.



Three new sizes now complete the standard line of Universal quality drill bushings. All Universals have rust proof black domes and superfinished bores assuring concentricity and unexcelled wearing qualities. Write for facts.

**UNIVERSAL**  
Engineering Company  
Frankenmuth, Mich.

### Felt Sample File and Chart

The convenience of the combined felt chart-and-sample file introduced several years ago by the Booth Felt Co., 434 19th St., Brooklyn, N. Y., has been



recognized by felt users throughout industry. Such industrialists will be interested in a revised form of application chart now being issued by Booth.

## BURKE

### MILLING MACHINES

Make Fast Work of Small Jobs

Motor  
Driven

Timken  
roller or  
ball bear-  
ings to  
spindle

Write today for  
circulars.



**Burke Machine Tool Co.**  
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**SHELDON****ARBOR PRESSES  
and VISES**

SHELDON Arbor Presses stronger, handier, more versatile vises, correctly designed and accurately machined from quality materials with heat-treated and ground round rams with means for holding accurate alignment, and non-stripping alloy steel gears. 10 sizes, 3 to 10 tons. Simple, compound or wheel levers.



SHELDON Machine Vises come in 5 types including: Drill Press, Milling, Shaper, Plain, and Swivel base vises.

*Write for Catalog Sheets*

**The Sheldon Machine Co.**  
1629 N. Kilbourn Ave., Chicago, U.S.A.

**Armstrong Reversible Ratchet**

Armstrong Bros. Tool Co., "The Tool Holder People," 308 N. Francisco Ave., Chicago, announce a new miniature reversible ratchet and 4 new drivers for their miniature detachable head wrenches. The reversible ratchet is only 4" long. It is machined from special chrome vanadium steel finished in chrome plate. The ratchet is of improved design with hardened gear and instant reversing thumb switch. The other 4 miniature drivers added to this series are:—flexible head handle, a screw driven type extension spin-grip which permits locking head so that it can be used also as a spinning extension, and long and short extensions.

**Jessop Issues Die Section Chart**

Jessop Steel Co., 603 Green St., Washington, Pa., offers a new wall chart which gives the specifications for their rolled composite die sections, used in

dies for cutting sheet metal to regular or irregular shapes.

End views of eight different die sections are illustrated, and the rolled sizes are listed in a readable table. Also included are the weights per foot in lengths of eight to 10 feet, varying from 7.25 lbs. for Section D to 23.94 lbs. for Section CC.

Among the advantages of Jessop rolled composite die sections, as set forth, are ease of machining and forming and the possibility of drilling dowel and screw holes after hardening. Savings claimed over rectangular sections vary from 28% to 47%, depending on the section. Typical applications of sectional dies, ranging from railroad cars to metal toys, are given, as well as the recommended heat treatment.

The chart is printed on heavy, varnished cardboard stock to withstand rough handling. It is available to interested readers without cost.

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LASTS LONGER—WORKS BETTER**

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PORTABLE ELECTRIC

**BLOWER & SUCTION CLEANER**

**TO CLEAN—**

**Lathes**  
**Punch Presses**  
**Hoists**  
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**Motors**  
**Fixtures**  
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5 MODELS  
ASK FOR 10 DAYS  
FREE TRIAL

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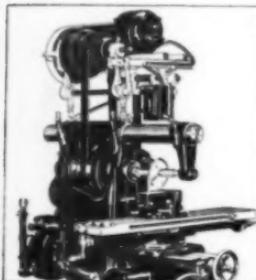
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The BMA-6 model shown, available in 12" or 15" size, has an extra large table with a working surface 25" x 34", adapting it particularly for tool and die shop use.



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Put your idle motors to work on Remco Drives. Remco's universal motor mounting will take any motor of reasonable size—new, or used. Only Remco offers this money-saving feature. Motors may be switched instantly, in case of a burn-out. What kind, and size, machines do you want motorized? Let us estimate. The low cost will surprise you. Remco Products Corp., State & Hay Sts., York, Pa.

**REMCO MOTOR DRIVES**

for LATHES, SHAPERS, DRILLS, MILLING MACHINES, etc.

Either can be had in multiple units, with one to six spindles.

A full complement of optional extras can be supplied including motor driven coolant systems, Avey-matic feed, friction type tapping attachments, high speed drilling attachments and many other features.

These really modern drilling units and many other styles and types are presented in catalog No. 39, issued by The Avey Drilling Machine Co., Cincinnati, Ohio.

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The Hargrave Superclamp No. 43 is a clamp that "can take it" in hard welding service. The frame is of forged steel, heat treated for maximum strength. The screw is especially made of strong and tough spatter-proof material to prevent loading of the threads, bending, breaking or

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Each clamp is subjected to a rigorous test on a special hydraulic testing machine, during which it is subjected to more than its rated load. In the case of the 4" size, the test load is 8,000 lbs. while the 12" clamp must withstand 12,000 lbs.

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No tang or taper required. Uses broken or whole drills. Adjusts to within .002" to .003". Write for facts.

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Sturdiness is assured by a 30% increase in weight of the drive shaft, together with hardening and grinding of this important member.

Both shaft ends are provided with Victoprene graphite impregnated oil seals.



Gear ratios have been rearranged and proportioned in such a manner as to meet the requirements of more machine tools with higher efficiency. Ratios on all units are identical.

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mechanism. The No. 1 adapter is for special motors from one to five h. p. inclusive. This arrangement reduces the total length approximately six inches and makes a very compact unit. The No. 2 adapter is made to fit standard ball bearing motors equipped with face type and shield mounting, from No. 204 NEMA frame size to No. 254 inclusive. The No. 3 adapter covers the range from No. 284 frame size to No. 364 inclusive.

All Model C Drives are identical in size (exclusive of motor) and made to fit standard cradle brackets regardless of whether a one or a 10 h.p. motor is used.

Motors may be mounted and removed from the unit without moving the drive from its position.

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MILLS OVER 1000 PARTS PER HOUR

Work held by draw in collets. Collets open and close automatically. Work automatically ejected. Indexes without loss of time for milling 1, 2, 3, 4, 6, 8, 12 or 24 sided pieces. Minimum set-up time required. Speeds up production. Positive and accurate in operation.

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**FEATURES**

- \* Motor, Switch, Cord and Shaft complete.
- \* Oversize core; all-resistant casing.
- \* Shaft reinforced. Oilitite Bearings.
- \* Hand piece, ball bearings, labyrinth oil-seal.

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Bansbach Machinery Corp. is located in attractive new quarters at 3845 W. Madison St., Chicago—in what is generally considered to be the heart of Chicago.

The building was formerly an automobile display room, with a 56-foot frontage on Madison St. The big plate glass full length windows and overhead spotlights make it possible to display a large stock of attractive tools in a very striking manner.

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**Vertical  
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GRINDER**

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stoning dies and  
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modern oscilla-  
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form tools including Tungsten Carbide.

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With the wider use of Tungsten Carbide tools, equipment for grinding and lapping is increasing.

The All-In-One grinder is the result of extensive experience in the handling of Tungsten Carbide tools. Safe, flexible and speedy, it is asserted that tool injury is impossible due to the low wheel speed and the use of proper wheels.

The unit is furnished complete with two adjustable work tables. A 6" diameter x 1½" face Silicon Carbide cup wheel is provided for roughing, and a 4" diameter x 3/8" face diamond set metal cup lap is furnished for finishing.

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Full details may be obtained by addressing T. C. M. Mfg. Co., 310 First St., Harrison, N. J.

### The CHAMPION Line



Shop Furniture, Emery Wheel  
Dressers and Cutters, Etc.

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A cemented tungsten carbide produced by our HOT PRESSED method increases density and durability.

Convince yourself—Test it for production efficiency and economy against other cutting tools—Prices are also economical—Write for quotations and new catalogue.

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Challenge Mch. Co., Grand Haven, Mich.  
Cincinnati Electrical Tool Co., Cincinnati, Ohio  
Tannevitz Works, Grand Rapids, Mich.

**Accumulators**

Daley & Sibley Mch. Dealers, New Haven, Conn.

**Account-Booths**

Burgess Battery Co., 500 W. Huron St., Chicago.

**Adapters, Adjustable**

Glenzer Company, J. C., Detroit, Mich.

**Air Filtering Machines**

Lincoln Electric Co., Cleveland, Ohio

**Alloys, Low Melting**

Cerro de Pasco Copper Corp., 44 Wall St., N. Y.

**Angle Plates**

McMahon Co., Frank, Dayton, Ohio

**Arbors**

Kearney & Trecker Corp., Milwaukee, Wis.

**Balancing Ways**

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Sundstrand Machine Tool Co., Rockford, Ill.

**Baling Presses**

Galland-Henning Mfg. Co., Milwaukee, Wis.

**Ball Bearings, Miniature**

Landis & Gyr, Inc., 104 5th Ave., N. Y. C.

**Band Saw Machines, for Metal**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Boice-Crane Co., Toledo, Ohio  
Delta Mfg. Co., Milwaukee, Wis.  
Kalamazoo T. & S. Co., Kalamazoo, Mich.  
Oliver Machinery Co., Grand Rapids, Mich.  
Tannevitz Works, Grand Rapids, Mich.  
Wells Mfg. Co., Three Rivers, Mich.

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Buffalo Forge Company, Buffalo, N. Y.  
Hyrson & Son, Jos. T., 16th & Rockwell, Chgo.

**Bearings**

Chicago Die Cast. Mfg. Co., 2502 W. Monroe, Chgo.  
Belt Sanders

Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.

**Belts, V-Type**

Boice-Crane Co., Toledo, Ohio.

Delta Mfg. Co., Milwaukee, Wis.

**Bench Legs, Steel**

Standard Pressed Steel Co., Jenkintown, Pa.

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Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

**Bending Rolls**

Buffalo Forge Co., Buffalo, N. Y.  
Marshalltown Mfg. Co., Marshalltown, Ia.  
Hyrson & Son, Jos. T., 16th & Rockwell, Chgo.

**Bins**

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Pusum Tool Co., Detroit, Mich.

**Blow Torch Pumps**

National Safety Device Co., 836 Hubbard, Chgo.

**Blowers, Portable Electric**

Buffalo Forge Co., Buffalo, N. Y.  
Clements Mfg. Co., 6650 Narragansett, Chicago  
General Blower Co., 401 N. Peoria St., Chicago

Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.

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Flynn Manufacturing Co., Detroit, Mich.

**Boring Heads, Prec.**

Maxwell Co., F. A., Bedford, Ohio

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R & L Tools, Nicetown, Phila., Pa.

**Boring Machines, Horiz.**

Avey Drilling Mch. Co., Cincinnati, Ohio

**Brakes, Hand and Power**

Dreis & Krump Mfg. Co., 7440 S. Loomis Blvd., Chicago, Ill.

Eyerson & Son, Jos. T., 16th & Rockwell, Chgo.

Vernon Allsteel Press Co., 9303 S. Kenwood, Chgo.

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Acro Welder Mfg. Co., Milwaukee, Wis.

Oliver Machinery Co., Grand Rapids, Mich.

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Illinois Tool Works, 2501 N. Keebler, Chicago

Taylor Machine Co., Cleveland, Ohio

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Colonial Broach Co., Detroit, Mich.

**Broach Sharpening Machines**

Colonial Broach Co., Detroit, Mich.

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**Buffers, Bench**

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Mail Tool Co., 5742 S. Chicago Ave., Chicago, Ill.

Vonnegut Moulder Corp., Indianapolis, Ind.

**Buffers, Pedestal**

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Vonnegut Moulder Corp., Indianapolis, Ind.

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Beatty Mch. & Mfg. Co., Hammond, Ind.

**Burrs, Steel**

White Dental Mfg. Co., S. S., 16 E. 40th, N. Y. C.

**Bushings, Jig**

Acme Industrial Co., 210 N. Laflin St., Chicago

Colonial Broach Co., Detroit, Mich.

**Bushings, Steel**

Acme Industrial Co., 210 N. Laflin St., Chicago

Baumbach Mfg. Co., E. A. 1812 So. Kilbourne Ave., Chicago, Ill.

Universal Engineering Co., Frankenmuth, Mich.

**Calcium Molybdate**

Climax Molybdenum Co., 500 Fifth Ave., N.Y.C.

**Calipers**

Scher Co., Geo., 122 Lafayette, N. Y. C.

**Cams, Alloy Steel**

Modern Collet & Machine Co., Ecorse, Mich.

**Cap Screws**

Triplex Screw Co., Cleveland, Ohio

**Carbide Tool Salvage**

Super Tool Co., Detroit, Mich.

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Modern Machine Corp., Brooklyn, N. Y.

Motor Tool Mfg. Co., Detroit, Mich.

Nielsen, Inc., Lawton, Mich.

Rigid Tool Holder Co., Detroit, Mich.

Victor Mch. Exch., 251 Centre, N. Y. C.

**Chains, Silent and Roller**

Chicago Gear Works, 440 N. Oakley, Chicago

Cullinan Wheel Co., 1359 Altgeld St., Chicago

**Chamfering Machines, Automatic**

Grant Mfg. & Machine Co., Bridgeport, Conn.

**Chrome Plating, Hard**

Master Chrome Service, Cleveland, Ohio

**Chuckings, Fingers**

Modern Collet & Machine Co., Ecorse, Mich.

Morrison Machine Products Div., Elmira, N. Y.

**Chucks, Air**

Hannifin Mfg. Co., 621 S. Kolmar, Chicago

Tomkins-Johnson Co., Jackson, Mich.

**Chucks, Automatic**

Procurer Safety Chuck Co., 14 S. Clinton St.

**Chucks, Collet**

Erickson Steel Co., Cleveland, Ohio

Hardinge Brothers, Inc., Elmira, N. Y.

Procurer Safety Chuck Co., 14 S. Clinton St.

Chicago, Ill.

**Chucks, Drill and Tap**

Universal Eng. Co., Frankenmuth, Mich.

Etrington Mech. Labor, Staten Island, N. Y.

Etco Tool Co., 594 Johnson Ave., Brooklyn, N. Y.

Hartford Special Mach'y Co., Hartford, Conn.

Nielsen, Inc., Lawton, Mich.

Procurer Safety Chuck Co., 14 S. Clinton St.

Chicago, Ill.

Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Victor Mch. Exch., 251 Centre, N. Y. C.

**Chucks, Drill**

Jacobs Mfg. Co., Hartford, Conn.

## Buyers' Directory

**Chucks, Drill, Keyless**  
Motor Tool Mfg. Co., Detroit, Mich.

**Chucks, Drill, for Screw Machines**  
Motor Tool Mfg. Co., Detroit, Mich.

**Chucks, Lathe**  
L-W Chuck Co., Toledo, Ohio

**Chucks, Magnetic**  
Brown & Sharpe Mfg. Co., Providence, R. I.

**Chucks, Quick Change**  
Glenzer Company, J. C., Detroit, Mich.

Procunier Safety Chuck Co., 14 So. Clinton St., Chicago, Ill.

**Clamps, Die**  
Danly Mch. Specialties, Inc., 2130 S. 52nd Ave., Cicero, Ill.

**Clamping Devices, Air Operated**  
Hamlin Mfg. Co., 621 S. Kolmar, Chicago

**Clutches, Friction**  
Conway Clutch Co., Cincinnati, Ohio

**Collets and Feed Fingers**  
Modern Collet & Machine Co., Ecorse, Mich.

Morrison Machine Products Div., Elmira, N. Y.

Sutton Tool Co., Detroit, Mich.

**Collets for all Lathes and Millers**  
Hardinge Brothers, Inc., Elmira, N. Y.

Modern Collet & Machine Co., Ecorse, Mich.

Sutton Tool Co., Detroit, Mich.

**Collet Tubes**  
Modern Collet & Machine Co., Ecorse, Mich.

Sutton Tool Co., Detroit, Mich.

**Comparators**  
Federal Products Corp., Providence, R. I.

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Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

**Contract Work Wanted**  
Beatty Mch. & Mfg. Co., Hammond, Ind.

Burke Machine Tool Co., Conneaut, Ohio

**Coping Machines**  
Beatty Mch. & Mfg. Co., Hammond, Ind.

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Glenzer Company, J. C., Detroit, Mich.

Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

Threadwell Tap & Die Co., Greenfield, Mass.

**Countersinks**  
Dunlap Mfg. Co., Milwaukee, Wis.

**Coulters**  
Glenzer Company, J. C., Detroit, Mich.

Severance Tool Mfg. Co., Saginaw, Mich.

**Couplings, Belt**  
Nicholson Co., W. H., Wilkesbarre, Pa.

**Couplings, Flexible**  
Chi. Die Cast, Mfg. Co., 2502 W. Monroe, Chgo.

**Couplings, Friction Clutch**  
Conway Clutch Co., Cincinnati, Ohio

**Cranes**  
Shaw-Box Crane & Hoist Co., 435 Broadway, Muskegon, Mich.

**Cut-off Machines**  
Cincinnati Electrical Tool Co., Cincinnati, Ohio

**Cut-off Saws**  
Oliver Machinery Co., Grand Rapids, Mich.

Tanenwitz Works, Grand Rapids, Mich.

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Gorton Machine Co., Geo., Racine, Wis.

Oliver Instrument Co., Adrian, Mich.

**Cutters**  
Progressive Tool & Cutter Co., Ferndale, Mich.

Putnam Tool Co., Detroit, Mich.

Quality Tool Works, Waukegan, Ill.

Tomkins-Johnson Co., Jackson, Mich.

**Cutters, Keyway**  
Threadwell Tap & Die Co., Greenfield, Mass.

**Cutters, Widget Milling**  
Ford Mfg. Co., M. A., Davenport, Iowa

Severance Tool Mfg. Co., Saginaw, Mich.

**Cutters, Milling**  
Brown & Sharpe Mfg. Co., Providence, R. I.

Eastern Cutter Salvage Corp., Newark, N. J.

Illinois Tool Works, 2501 N. Keeler, Chicago

Master Tool Co., Cleveland, Ohio

Modern Mch. Tool Co., Jackson, Mich.

Reisinger Mfg. Co., Rochester, N. Y.

Renn Tool Company, Detroit, Mich.

Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

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**Cutters, Taper Reaming**  
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Severance Tool Mfg. Co., Saginaw, Mich.

**Cutters, Woodruff**  
Glenzer Company, J. C., Detroit, Mich.

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**Cutting Tools (Kennametal)**  
McKenna Metals Co., Latrobe, Pa.

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Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

**Cut-Off Machines**  
Modern Mch. Tool Co., Jackson, Mich.

**Cylinders, Air**  
Bell Machine Co., Oshkosh, Wis.

Galland-Henning Mfg. Co., Milwaukee, Wis.

Hanna Engineering Works, 1763 Elston, Chicago

Hannifin Mfg. Co., 621 S. Kolmar, Chicago

Tomkins-Johnson Co., Jackson, Mich.

**Demagnetizers**  
Electro-Matic Products Co., 4036 N. Kolmar, Chgo.

Luna Electric Equipment Co., Toledo, Ohio

L-W Chuck Co., Toledo, Ohio

Printz Electric Co., Detroit, Mich.

Victor Machinery Co., 130 S. Clinton St., Chicago, Ill.

**Diamonds**  
Industrial Diamond Co., Detroit, Mich.

**Diamond Dressings**  
Industrial Diamond Co., Detroit, Mich.

**Diamond Pointed Tools**  
Industrial Diamond Co., Detroit, Mich.

**Dies**  
Circle Tip Tool Corp., East Orange, N. J.

McKenna Metals Co., Latrobe, Pa.

Threadwell Tap & Die Co., Greenfield, Mass.

**Die Castings**  
Chi. Die Cast, Mfg. Co., 2502 W. Monroe, Chgo.

**Die Cushions**  
Dayton-Rogers Mfg. Co., Minneapolis, Minn.

**Die Duplicating Machines**  
Gorton Machine Co., Geo., Racine, Wis.

Madison-Kipp Corp., Madison, Wis.

Univ. High Speed Tool Co., 549 Wash. Blvd., Chgo.

**Die Filing Machines**  
Armco Co., Milwaukee, Wis.

**Die Fillers**  
Armco Co., Milwaukee, Wis.

Continental Machine Specialties, Minneapolis

Oliver Instrument Co., Adrian, Mich.

Postel Filing Mch. Co., Minneapolis, Minn.

**Die Making Machines**  
Continental Machine Specialties, Minneapolis

Harvey Mfg. Corp., 161 Grand, New York City

Oliver Instrument Co., Adrian, Mich.

Pratt & Whitney, Hartford, Conn.

Univ. High Speed Tool Co., 549 Wash. Blvd., Chgo.

**Die Makers' Supplies**  
Cerro de Pasco Copper Corp., 44 Wall St., New York, N. Y.

Dayton-Rogers Mfg. Co., Minneapolis, Minn.

**Die Sets**  
Baumbach Mfg. Co., E. A., 1812 S. Kilbourne Ave., Chicago, Ill.

Danly Mch. Specialties, 2130 So. 52nd, Chgo.

**Die, Blank and Forming**  
American Tool Works, Inc., Hartford, Conn.

Hamilton Tool Company, Hamilton, Ohio

**Dies, Perforating**  
Whistler & Sons, S. B., Buffalo, N. Y.

**Dividing Heads**  
Wm. Carroll & Son, Norwood, Cincinnati, O.

L-W Chuck Co., Toledo, Ohio

**Dowel Pins, Steel**  
Acme Industrial Co., 210 N. Laflin St., Chicago

Baumbach Mfg. Co., E. A., 1812 S. Kilbourne Ave., Chicago, Ill.

**Drawing Instruments**  
Wade Instrument Co., Cleveland, Ohio.

## Buyers' Directory

**Dressers, Emery Wheel**  
Carboly Co., Detroit, Mich.  
M & S Dresser, Hartford, Conn.

**Dressers, Grinding Wheel**  
Desmond-Stephan Mfg. Co., Urbana, Ohio

**Dressers, Radius**  
Bergman Mech. Eng. Co., New Britain, Conn.

**Drill Bushings**  
Acme Industrial Co., 210 N. Laflin St., Chicago  
Universal Eng. Co., Frankenmuth, Mich.

**Drill Jigs, Spec. & Univ.**  
Heuser Mfg. Co., 1638 N. Paulina St., Chicago

**Drills, Core**  
Glenzer Company, J. C., Detroit, Mich.

**Drills, Electric**  
Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.  
Cincinnati Electrical Tool Co., Cincinnati, Ohio  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Master Tool Co., Cleveland, Ohio  
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.  
Speedway Mfg. Co., 1822 S. 52nd, Cicero, Ill.  
Stanley Electric Tool Div., New Britain, Conn.

**Drills, Pneumatic**  
Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

**Drills, Tap Shank**  
Victor Mch., Exch., 251 Centre, N. Y. C.

**Drill Grinders**  
Black Diamond Saw & Machine Works, Inc.,  
Natick, Mass.  
Gallmeyer & Livingston Co., Gr. Rapids, Mich.  
Oliver Instrument Co., Adrian, Mich.  
Sellers & Co., Wm., Philadelphia, Pa.  
Star Electric Motor Co., Bloomfield, N. J.

**Drill Press Heads**  
Boice-Crane Co., Toledo, Ohio  
Delta Mfg. Co., Milwaukee, Wis.  
Walker-Turner Company, Plainfield, N. J.

**Drill, Attach, High Speed**  
Graham Mfg. Co., Providence, R. I.  
**Drilling Machines, Bench**

Ames Co., B. C., Waltham, Mass.  
Avey Drilling Mch. Co., Cincinnati, Ohio  
Ayer Mfg. Co., F. H., Chicago Heights, Ill.  
Boice-Crane Co., Toledo, Ohio  
Buffalo Forge Company, Buffalo, N. Y.  
Burke Machine Tool Co., Conneaut, Ohio  
Delta Mfg. Co., Milwaukee, Wis.

**Drilling Machines, Multiple Spindle**  
Avey Drilling Mch. Co., Cincinnati, Ohio  
Boice-Crane Co., Toledo, Ohio  
Buffalo Forge Company, Buffalo, N. Y.  
Candy-Otto Mfg. Co., Chicago Heights, Ill.  
Delta Mfg. Co., Milwaukee, Wis.

**Drilling Machines, Portable Electric**  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Skilaw, Inc., 3304 Elston Ave., Chicago, Ill.  
Stowbar Mfg. Co., 1822 S. 52nd Ave., Cicero, Ill.  
White Dental Mfg. Co., 8 S. 10 E. 40th, N. Y. C.  
Wodak Elec. Tool Corp., 4629 W. Huron, Chicago

**Drilling Machines, Post**  
Buffalo Forge Company, Buffalo, N. Y.

**Drilling Machines, Sensitive**  
Avey Drilling Mch. Co., Cincinnati, Ohio  
Ayer Mfg. Co., F. H., Chicago Heights, Ill.  
Boice-Crane Co., Toledo, Ohio  
Buffalo Forge Company, Buffalo, N. Y.  
Burke Machine Tool Co., Conneaut, Ohio  
Delta Mfg. Co., Milwaukee, Wis.  
Hamilton Tool Co., Hamilton, Ohio  
Taylor Sales Co., Milwaukee, Wis.

**Drilling Machines, Vertical**

Avey Drilling Mch. Co., Cincinnati, Ohio  
Buffalo Forge Company, Buffalo, N. Y.

**Drilling Mch., Wall Type**

Ayer Mfg. Co., F. H., Chicago Heights, Ill.

**Drives, Lathe**  
Berkeley Engineering Co., Cleveland, Ohio  
Drive-All Mfg. Co., Detroit, Mich.  
Cullinan Wheel Co., 1359 Altgeld St., Chicago  
Hardinge Brothers Inc., Elmira, N. Y.  
The Tord Electric Mfg. Co., Cleveland, Ohio  
Westlif Tool & Mfg. Co., Detroit, Mich.

**Drives, Machine Tool**  
Drive-All Mfg. Co., Detroit, Mich.  
The Tord Electric Mfg. Co., Cleveland, Ohio  
Westlif Tool & Mfg. Co., Detroit, Mich.

**Drives, Punch Press**  
The Tord Electric Mfg. Co., Cleveland, Ohio

**Drives, Shaper**  
The Tord Electric Mfg. Co., Cleveland, Ohio  
Westlif Tool & Mfg. Co., Detroit, Mich.

**Drives, Turret Lathes**  
The Tord Electric Mfg. Co., Cleveland, Ohio

**Dynamometers, Hydraulic**

Taylor Sales Co., Milwaukee, Wis.

**Elevating Tables**  
Hamilton Tool Company, Hamilton, Ohio  
Midwest Tool & Engineer. Co., Dayton, Ohio

**Emery Wheel Dressers and Cutters**  
Western Tool & Mfg. Co., Springfield, Ohio

**End Mills**  
Glenzer Company, J. C., Detroit, Mich.  
Master Tool Co., Cleveland, Ohio  
Midwest Tool & Mfg. Co., Detroit, Mich.  
Progressive Tool & Cutter Co., Ferndale, Mich.  
Putnam Tool Co., Detroit, Mich.

Renn Tool Company, Detroit, Mich.  
Victor Mch., Exch., 251 Centre, N. Y. C.

**Engraving Machines**  
Gorton Machine Co., Geo., Racine, Wis.  
Luna Electric Equipment Co., Toledo, Ohio  
Printz Electric Co., Detroit, Mich.

**Etching Machines, Electric**  
Brewster Co., Wm., 50 Church St., N. Y. C.

**Exhaust Blowers**

Buffalo Forge Company, Buffalo, N. Y.

**Experimental Work**  
American Tool Works, Inc., Hartford, Conn.

**Extractors, Tap**  
Walton Co., Hartford, Conn.

**Facers, Spot**  
Circle Tip Tool Corp., East Orange, N. J.  
Glenzer Company, J. C., Detroit, Mich.

**Feed Fingers for Auto. Screw Machines**  
Modern Collet & Machine Co., Ecorse, Mich.  
Morrison Machine Products Div., Elmira, N. Y.  
Sutton Tool Co., Detroit, Mich.

**Ferro-Molybdenum**  
Climax Molybdenum Co., 500 Fifth Ave., N.Y.C.

**Films**

Grobet File Corp. of America, 3 Park Pl., N.Y.C.  
Oliver Instrument Co., Adrian, Mich.  
Victor Mch., Exch., 251 Centre, N. Y. C.

**Films, All Types**  
Nicholson File Co., Phila., Pa.

**Fists, Rotary**  
Ford Mfg. Co., M. A., Davenport, Iowa  
Grobet File Corp. of America, 3 Park Place,  
New York, N. Y.

Hamilton Tool Company, Hamilton, Ohio  
Pratt & Whitney Div., Hartford, Conn.  
Severance Tool Mfg. Co., Saginaw, Mich.

White Dental Mfg. Co., 8 S. 10 E. 40th, N. Y. C.

**Filing Machines**  
Continental Machine Specialties, Minneapolis  
Harvey Mfg. Corp., 161 Grand, New York City  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Oliver Instrument Co., Adrian, Mich.  
Univ. High Speed Tool Co., 549 Wash. Blvd., Chg.

**Filing Room Equipment**  
Wardwell Manufacturing Co., Cleveland, Ohio

**Flexible Shafts and Accessories**  
Haskins Co., R. G., 623 S. California, Chicago

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Stow Mfg. Company, Binghamton, N. Y.  
Walker-Turner Company, Plainfield, N. J.

Wyzanbeck & Staffs, Inc., 838 W. Hubbard, Chgo.

## Buyers' Directory

**Flexible Shaft Machinery**

Haskins Co., R. G., 623 S. California, Chicago  
 Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
 Pratt & Whitney, Hartford, Conn.  
 Waukesha Tool, Inc., 838 W. Hubbard, Chgo.

**Flanging Holders**

Glenzer Company, J. C., Detroit, Mich.

**Flue Lathes**

Marshalltown Mfg. Co., Marshalltown, Ia.

**Flue Welders**

Marshalltown Mfg. Co., Marshalltown, Ia.

**Forming Tools**

Circle Tip Tool Corp., East Orange, N. J.

Michigan Tool Co., Detroit, Mich.

Morrison Machine Products Div., Elmira, N. Y.

**Furnaces, Industrial**

Strong, Carlisle & Hammond Co., Cleveland, Ohio

**Furniture, Machine Shop**

Standard Pressed Steel Co., Jenkintown, Pa.

Western Tool & Mfg. Co., Springfield, Ohio

**Gages**

Ames Co., B. C., Waltham, Mass.

Federal Products Corp., Providence, R. I.

Hammond Mch. Builders, Kalamazoo, Mich.

United Precision Products Co., 4618 W. Huron, Chicago

**Gages, Auto, for Dies**

Daniy Mch. Specialties, Inc., 2130 S. 52nd Ave., Cicero, Ill.

**Gages, Pin, Plug, Ring and Snap**

American Tool Works, Inc., Hartford, Conn.

United Precision Products Co., 4618 W. Huron, Chicago

**Gages, Pressure**

Marshalltown Mfg. Co., Marshalltown, Ia.

**Gages, Taper**

Hartford Special Machinery Co., Hartford, Conn.

**Gears**

Ahart Gear & Mch. Co., 4832 W. 16th St., Chgo.

Chicago Gear Works, 440 N. Oakley, Chicago

Taylor Machine Co., Cleveland, Ohio

**Generators, Motor**

Chicago Elec. Co., 1330 W. Cermak Rd., Chgo.

Lincoln Electric Co., Cleveland, Ohio

Star Electric Motor Co., Bloomfield, N. J.

**Grinders, Air**

Madison-Kipp Corp., Madison, Wis.

**Grinders, Bench**

Baldor Electric Co., St. Louis, Mo.

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Delta Mfg. Co., Milwaukee, Wis.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Stanley Electric Tool Div., New Britain, Conn.

Vonnegut Moulder Corp., Indianapolis, Ind.

Walker-Turner Company, Plainfield, N. J.

**Grinders, Cutter, Reamer & Tool**

Bergman Mech. Eng. Co., New Britain, Conn.

**Grinders, Disc**

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Gaston Power Tools Co., Evergreen Park, Ill.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Oliver Machinery Co., Grand Rapids, Mich.

Wyzembach & Staff, Inc., 838 W. Hubbard, Chgo.

**Grinders, Flexible Shaft**

Haskins Co., R. G., 623 S. California, Chicago

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Stanley Electric Tool Div., New Britain, Conn.

**Grinders, Hand**

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Dremel Mfg. Co., Racine, Wis.

Dunton Co., Racine, Wis.

Dunton Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.

M-B Products Co., Detroit, Mich.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Skilsaw, Inc., 3304 Elston Ave., Chicago, Ill.

**Grinders, Heavy Duty**

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Vonnegut Moulder Corp., Indianapolis, Ind.

**Grinders, High Speed**

Bridgeport Machines, Inc., Bridgeport, Conn.

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Dremel Mfg. Co., Racine, Wis.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Uni. High Speed Tool Co., 549 Wash. Blvd., Chgo.

**Grinders, Internal**

Bergman Mech. Eng. Co., New Britain, Conn.

**Grinders, Pedestal Electric**

Baldor Electric Co., St. Louis, Mo.

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Delta Mfg. Co., Milwaukee, Wis.

**Grinders, Portable Precision**

Maxwell Co., F. A., Bedford, Ohio

**Grinders, Precision**

Dumore Co., Racine, Wis.

**Grinders, Production Surface**

Bergman Mech. Eng. Co., New Britain, Conn.

Gallmeyer & Livingston Co., Gr. Rapids, Mich.

**Grinders, Snapping**

Cincinnati Electrical Tool Co., Cincinnati, Ohio

**Grinders, Surface, Auto. Feed**

Gallmeyer & Livingston Co., Gr. Rapids, Mich.

**Grinders, Swing Frame**

Vonnegut Moulder Corp., Indianapolis, Ind.

**Grinders, Tool**

T. C. M. Mfg. Co., Harrison, N. J.

**Grinders, Tool Room, Surface**

Bergman Mech. Eng. Co., New Britain, Conn.

**Grinders, Utility**

Bergman Mech. Eng. Co., New Britain, Conn.

**Grinders, Univ. Tools & Cutter**

LeBlond Mch. Tool Co., B. K., Cincinnati, Ohio

**Grinders, Vert. Oscillatory**

Atlas Press Co., Kalamazoo, Mich.

Carlson Mfg. Co., C. H., Minneapolis, Minn.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

Oliver Instrument Co., Adrian, Mich.

**Grinding, Centerless (Contract)**

Eastern Centerless Grind. Co., Hartford, Conn.

Heim Company, Fairfield, Conn.

**Grinding Machines, Belt**

Armiglo Co., Milwaukee, Wis.

Walls Sales Corp., 96 Warren St., New York

**Grinding Machines, Cutter, Reamer and Tool**

Brown & Sharpe Mfg. Co., Providence, R. I.

Gallmeyer & Livingston Co., Gr. Rapids, Mich.

Lee & Son, K. O., Aberdeen, S. Dak.

National Machine Tool Co., Racine, Wis.

Oliver Instrument Co., Adrian, Mich.

**Grinding Machines, Portable Electric**

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

Chicago Wheel & Mfg. Co., 1101 W. Monroe St., Chicago, Ill.

Dremel Mfg. Co., Racine, Wis.

Duro Metal Products Co., 2651 N. Kildare Ave., Chicago, Ill.

Haskins Co., R. G., 623 S. California, Chicago

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

National Machine Tool Co., Racine, Wis.

Pratt & Whitney, Hartford, Conn.

Stow Mfg. Company, Binghamton, N. Y.

White Mfg. Co., S. S. 10 E. 40th, N. Y. C.

Worrell Elec. Tool Corp., 4629 W. Huron, Chicago

**Grinding Mch., Port. Pneumatic**

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

**Grinding Wheels**

Chicago Wheel & Mfg. Co., 1101 W. Monroe

St. Chicago, Ill.

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.

**Guards, Punch Press**

Grand Haven Stamped Products, Gr. Haven, Mich.

**Guards, Spot Welder**

Grand Haven Stamped Products, Gr. Haven, Mich.

**Hack Saw Blades**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale

Ave., Chicago, Ill.

Racine Tool & Mch. Co., Racine, Wis.

Victor Mch. Exch., 251 Centre, N. Y. C.

**Hack Saw Machines**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale

Ave., Chicago, Ill.

L-W Chuck Co., Toledo, Ohio

Racine Tool & Mch. Co., Racine, Wis.

**Hammers, Chipping**

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

Master Tool Co., Cleveland, Ohio

## Buyers' Directory

**Hammers, Portable Electric**

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.  
Stanley Electric Tool Div., New Britain, Conn.  
Wodak Elec. Tool Corp., 4629 W. Huron, Chicago

**Hammers, Riveting**

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

**Hand Saws, Portable Electric**

Skilhaw, Inc., 3304 Elston Ave., Chicago, Ill.

**Hand Screw Machine Live Centers**

Motor Tool Mfg. Co., Detroit, Mich.

**Hand Screw Machines, Precision**

Hardinge Brothers, Inc., Elmira, N. Y.

**Handspikes, Reciprocating**

Stow Mfg. Company, Binghamton, N. Y.

**Heads, Boring**

Flynn Manufacturing Co., Detroit, Mich.

**Heads, Die**

Eastern Mch. Screw Corp., New Haven, Conn.

**Hinges, Continuous Steel**

Auto. Moulding & Mfg. Co., 2326 S. Canal, Chicago, Ill. & S. Machine Works, 4543 W. Lake, Chicago

**Hinges, Plain and Offset**

Auto. Moulding & Mfg. Co., 2326 S. Canal, Chicago, Ill. & S. Machine Works, 4543 W. Lake, Chicago

**Hobs**

Illinoian Tool Works, 2501 N. Keeler, Chicago  
Michigan Tool Co., Detroit, Mich.

**Hoists, Chain—Bought and Sold**

Logeman, T. V., Normandy (St. Louis Co.), Mo.

**Hoists, Chain—Serviced**

Logeman, T. V., Normandy (St. Louis Co.), Mo.

**Hoists, Electric**

Shaw-Box Crane & Hoist Co., 435 Broadway, Muskegon, Mich.

**Index Centers**

Brown & Sharpe Mfg. Co., Providence, R. I.  
Wm. Carroll & Son, Norwood, Cincinnati, Ohio  
L.W. Chuck Co., Toledo, Ohio

**Indicators, Dial**

Federal Products Corp., Providence, R. I.

**Indicators, Surface Test**

Federal Products Corp., Providence, R. I.

**Jigs and Fixtures**

American Tool Works, Inc., Hartford, Conn.  
Hamilton Tool Company, Hamilton, Ohio  
Hartford Special Machinery Co., Hartford, Conn.  
Hensler Manufacturing Co., 1638 N. Paulina, Chicago

**Keyseating Machines**

Burr & Son, John T., Brooklyn, N. Y.

**Lathe Live Centers**

Modern Machine Corp., Brooklyn, N. Y.

Motor Tool Mfg. Co., Detroit, Mich.

**Lathe Drives**

Cullinan Wheel Co., 1359 Altgeld St., Chicago  
Hardinge Brothers, Inc., Elmira, N. Y.

**Lathe, Automatic**

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio  
Lipe, Inc., W. C., Syracuse, N. Y.

**Lathe, Back Geared**

Atlas Press Co., Kalamazoo, Mich.  
Rivett Lathe & Grinder, Inc., Brighton, Boston  
South Bend Lathe Works, South Bend, Ind.

**Lathe, Bench**

Ames Co., B. C., Waltham, Mass.

Boice-Crane Co., Toledo, Ohio

Hardinge Brothers, Inc., Elmira, N. Y.

Rivett Lathe & Grinder, Inc., Brighton, Boston  
Sheldon Mch. Co., 1629 N. Kilbourn Ave., Chicago

South Bend Lathe Works, South Bend, Ind.

Wade Tool Co., Waltham, Mass.

**Lathe, Deep Hole Boring**

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

**Lathe, Engine**

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

South Bend Lathe Works, South Bend, Ind.

**Lathe, Gap**

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

**Lathe, Hollow Spindle**

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

**Lathe, Hydraulic**

Lipe, Inc., W. C., Syracuse, N. Y.

**Lathe, Manufacturing**

Sundstrand Machine Tool Co., Rockford, Ill.

**Lathes, Multicut**

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

**Lathes, Polishing & Buffing**

Cincinnati Electrical Tool Co., Cincinnati, Ohio

Hardinge Brothers, Inc., Elmira, N. Y.

**Lathes, Precision**

Elgin Tool Works, Div. Hardinge Mfg. Co., 1772

W. Bertean, Chicago

South Bend Lathe Works, South Bend, Ind.

**Lathes, Precision Bench**

Hardinge Brothers, Inc., Elmira, N. Y.

South Bend Lathe Works, South Bend, Ind.

Stark Tool Co., Waltham, Mass.

**Lathes, Screw Cutting**

Hardinge Brothers, Inc., Elmira, N. Y.

South Bend Lathe Works, South Bend, Ind.

Wade Tool Co., Waltham, Mass.

**Lathes, Speed**

Schuler Machine Co., Cincinnati, Ohio

**Lathes, Toolroom**

Hardinge Brothers, Inc., Elmira, N. Y.

LeBlond Mch. Tool Co., R. K., Cincinnati, Ohio

South Bend Lathe Works, South Bend, Ind.

**Layout Fluids**

Boston-Rogers Mfg. Co., Minneapolis, Minn.

**Layout Plates**

Challenger Mch. Co., Grand Haven, Mich.

**Layout Tables**

Busch Co., J. C., Milwaukee, Wis.

**Leaders Pins, Steel**

Acme Industrial Co., 210 Laflin St., Chicago, Ill.

**Leather Oil Retainers**

Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

**Length Standard**

Scherr Co., Geo., 122 Lafayette, N. Y. C.

**Lights, Elec. Movable**

Zagora Mch. & Gear Co., J., Charlotte, N. C.

**Lights, Shop**

Chi. Die Cast. Mfg. Co., 2502 W. Monroe, Chicago

Vimeo Mfg. Co., Buffalo, N. Y.

Zagora Mch. & Gear Co., J., Charlotte, N. C.

**Live Lathe Centers**

Glenzer Company, J. C., Detroit, Mich.

Modern Machine Corp., Brooklyn, N. Y.

Motor Tool Mfg. Co., Detroit, Mich.

**Lubricators, Air**

Norgren Co., C. A., Denver, Colorado

**Lubricators, Automatic**

M-B Products Co., Detroit, Mich.

Madison-Kipp Corp., Madison, Wis.

Norgren Co., C. A., Denver, Colorado

**Lubricators, Engine**

Madison-Kipp Corp., Madison, Wis.

**Lubricating Devices**

Essex Brass Corp., Detroit, Mich.

**Magnetic Chuck Demagnetizers**

Electro-Matic Products Co., 4036 N. Kolmar, Chicago.

**Mandrels**

Lee & Son Co., K. O., Aberdeen, S. Dak.

**Mandrels, Expanding**

Nicholson Co., W. H., Wilkes-Barre, Pa.

Western Tool & Mfg. Co., Springfield, Ohio

**Marking Machines**

Bates, H. O., Elizabeth, N. J.

New Method Steel Stamp. Inc., Detroit, Mich.

Schmidt, Geo. T., Inc., 1802 Belle Plaine Ave., Chicago, Ill.

**Meters, Air Velocity**

III. Testing Lab., 150 W. Austin, Chicago.

**Milling Attachments**

Bridgeport Machines, Inc., Bridgeport, Conn.

Burke Machine Tool Co., Connecut, Ohio

Wm. Carroll & Son, Norwood, Cincinnati, Ohio

Kearney & Trecker Corp., Milwaukee, Wis.

Uvin High Speed Tool Co., 549 Wash. Blvd., Cbg.

**Milling Cutters**

Master Tool Co., Cleveland, Ohio

Victor Mch. Exch., 251 Centre, N. Y. C.

**Milling Machine Live Centers**

Motor Tool Mfg. Co., Detroit, Mich.

**Milling Machines, Bench**

Burke Machine Tool Co., Connecut, Ohio

Hardinge Brothers, Inc., Elmira, N. Y.

Sundstrand Machine Tool Co., Rockford, Ill.

## Buyers' Directory

**Milling Machines, Hand**  
 Burke Machine Tool Co., Conneaut, Ohio  
 Sundstrand Machine Tool Co., Rockford, Ill.

**Milling Machines, Plain**  
 Burke Machine Tool Co., Conneaut, Ohio  
 Kearney & Trecker Corp., Milwaukee, Wis.  
 Sundstrand Machine Tool Co., Rockford, Ill.

**Milling Machines, Precision**  
 Elgin Tool Works, Div. Hardinge Mfg. Co., 1772 W. Beretka, Chicago

**Milling Machines, Universal**  
 Brown & Sharpe Mfg. Co., Providence, R. I.  
 Gorton Machine Co., Geo., Racine, Wis.  
 Kearney & Trecker Corp., Milwaukee, Wis.

**Milling Machines, Vertical**  
 Blank & Buxton Mch. Co., Jackson, Mich.  
 Gorton Machine Co., Geo., Racine, Wis.  
 Kearney & Trecker Corp., Milwaukee, Wis.

**Mills, Hollow**  
 Reisinger Mfg. Co., Rochester, N. Y.

**Motors, Electric**  
 Dremel Mfg. Co., Racine, Wis.  
 Lima Armature Works, Lima, Ohio  
 Lincoln Electric Co., Cleveland, Ohio  
 Star Electric Motor Co., Bloomfield, N. J.

**Motors, Elec. Internal Brakes**  
 Star Electric Motor Co., Bloomfield, N. J.

**Motors, Gearhead**  
 Lima Armature Works, Lima, Ohio

**Motors, Gearshift**  
 Lima Armature Works, Lima, Ohio

**Motors, Saw Arbor**  
 Lima Armature Works, Lima, Ohio

**Motors, Worm Gear**  
 Lima Armature Works, Lima, Ohio

**Motor Drives, Universal**  
 Berkeley Engineering Co., Cleveland, Ohio  
 Cullinan Wheel Co., 1359 Almond St., Chicago  
 Steege Mch. Co., W. L., 548 W. Monroe, Chgo.  
 Turner Uni-Drive Co., Kansas City, Mo.

**Motor Units, Worm Gear**  
 Star Electric Motor Co., Bloomfield, N. J.

**Moulds & Ladies, Hammer and Vise**  
 Johnson Tool Co., East Providence, R. I.

**Multiple Oilers**  
 Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

**Nails**  
 Hassall, Inc., John, Brooklyn, N. Y.

**Name Plates**  
 Bates, H. O., Elizabeth, N. J.

**Nibbling Machines**  
 Libert Machine Co., Green Bay, Wis.  
 National Machine Tool Co., Racine, Wis.

**Nut Setters**  
 Cincinnati Electrical Tool Co., Cincinnati, Ohio

**Oil Cups**  
 Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

**Oil Gauges**  
 Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

**Oil and Grease Seals**  
 Gits Bros. Mfg. Co., 1860 S. Kilbourn, Chicago

**Oilers, Automatic**  
 Trico Fuse Mfg. Co., Milwaukee, Wis.

**Pins, Leader and Dowel**  
 Aeme Industrial Co., 210 N. Laflin St., Chicago  
 Baumbach Mfg. Co., E. A., 1812 S. Kilbourne Ave., Chicago, Ill.

**Danly Mch. Specialties, Inc.**, 2130 S. 52nd Ave., Cicero, Ill.

**Pipe Threading Machines**  
 Triplex Machine Co., Pittsfield, Mass.

**Point Thinning Machines**  
 Oliver Instrument Co., Adrian, Mich.

**Polishing and Buffing Machines**  
 Excelsior Tool & Mch. Co., East St. Louis, Ill.

**Press Brakes**  
 Dres & Krumpp Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Verson Allsteel Press Co., 9303 So. Kenwood, Chi.

**Press Feeds**  
 Littell Machine Co., F. J., 4153 Ravenswood Ave., Chicago, Ill.  
 Rockford Iron Works, Rockford, Ill.  
 Wittek Mfg. Co., 4309 W. 24th Place, Chicago

**Presses, Arbor**  
 Atlas Press Co., Kalamazoo, Mich.  
 Fameco Machine Co., Racine, Wis.  
 Greenard Arbor Press Co., Nashua, N. H.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 McAffe Mfg. Co., 621 W. Kinzie, Chicago  
 Nicholson Mch. Co., W. H., Wilkes-Barre, Pa.  
 Sheldon Mch. Co., 1629 N. Kilbourn, Chicago  
 Tompkins-Johnson Co., Jackson, Mich.  
 Wilson, K. R., Buffalo, N. Y.

**Presses, Bench**  
 Fameco Machine Co., Racine, Wis.  
 Greenard Arbor Press Co., Nashua, N. H.  
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.  
 Rockford Iron Works, Rockford, Ill.

**Presses, Broaching**  
 Greenard Arbor Press Co., Nashua, N. H.

**Presses, Foot**  
 Famer Machine Co., Racine, Wis.  
 Rockford Iron Works, Rockford, Ill.

**Presses, Forming**  
 Marshalltown Mfg. Co., Marshalltown, Ia.

**Presses, Hydraulic**  
 Beatty Mch. & Mfg. Co., Hammond, Ind.  
 Elmes Eng. Works, Chas. F., 244 N. Morgan, Chgo.  
 Greenard Arbor Press Co., Nashua, N. H.

**Presses, Inclinable**  
 Federal Press Co., Elkhart, Ind.  
 Hannifin Mfg. Co., 621 S. Kolmar, Chicago  
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.  
 Marshalltown Mfg. Co., Marshalltown, Ia.  
 Rockford Iron Works, Rockford, Ill.  
 Ross Co., David J., Benton Harbor, Mich.

**Presses, Power**  
 Dres & Krumpp Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Federal Press Co., Elkhart, Ind.  
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.  
 Rockford Iron Works, Rockford, Ill.  
 Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.  
 Verson Allsteel Press Co., 9303 So. Kenwood, Chi.

**Presses, Punch**  
 Dres & Krumpp Mfg. Co., 7440 Loomis Blvd., Chicago, Ill.

Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.  
 Marshalltown Mfg. Co., Marshalltown, Ia.  
 Rockford Iron Works, Rockford, Ill.  
 Ross Co., David J., Benton Harbor, Mich.

**Presses, Sheet Metal**  
 Federal Press Co., Elkhart, Ind.  
 Loshbough-Jordan Tool & Mch. Co., Elkhart, Ind.

**Profiling Machines**  
 Gorton Machine Co., Geo., Racine, Wis.  
 Oliver Instrument Co., Adrian, Mich.  
 Wade Tool Co., Waltham, Mass.

**Pullers, Gripomatic**  
 Owatonna Tool Co., Owatonna, Minn.

**Pulley Machinery**  
 Avey Drilling Mch. Co., Cincinnati, Ohio

**Pulleys, Die Cast**  
 Chi. Die Cast. Mfg. Co., 2502 W. Monroe, Chgo.

**Pulleys, Vacuum Cup**  
 Vacuum Cup Metal Pulley Co., Detroit, Mich.

**Pumps**  
 Brown & Sharpe Mfg. Co., Providence, R. I.  
 Galland-Henning Mfg. Co., Milwaukee, Wis.

**Pumps, Centrifugal**  
 Fulvio Specialties Co., Blanchester, Ohio

**Pumps, Coolant**  
 Tompkins-Johnson Co., Jackson, Mich.

**Punch, Shear and Bender, Hand**  
 Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.

Buffalo Forge Co., Buffalo, N. Y.

**Punch Press Guards**  
 Ross Co., David J., Benton Harbor, Mich.

## Buyers' Directory

**Punches and Dies**

Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

**Punches, Hand**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Buffalo Forge Company, Buffalo, N. Y.  
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.  
Whitney Metal Tool Co., Rockford, Ill.

**Punches, Hand and Power**

Beatty Mch. & Mfg. Co., Hammond, Ind.  
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

**Punches, Piercing**

Durable Punch & Die Co., 2242 W. Grand, Chgo.

**Punches, Transfer**

McMahon Co., Frank, Dayton, Ohio

**Punches and Shears, Comb.**

Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

**Pyrometers**

Ill. Test. Laboratories, 150 W. Austin, Chicago  
Pyrometer Instrument Co., 102 Lafayette, N. Y. C.

**Pyrometers, Optical**

Pyrometer Instrument Co., 102 Lafayette, N. Y. C.

**Pyrometers, Portable and Stationary**

Pyrometer Instrument Co., 102 Lafayette, N. Y. C.

**Racks, Bar Stock**

Western Tool & Mfg. Co., Springfield, Ohio  
Wm. S. Yohe Supply Co., Canton, Ohio

**Raps**

Nicholson File Co., Phila., Pa.

**Reamers**

Glenzer Company, J. C., Detroit, Mich.  
Master Tool Co., Cleveland, Ohio  
Renu Tool Company, Detroit, Mich.

**Resurfacers, Concrete**

Flexrock Co., Philadelphia, Pa.

**Rivets**

Hassall, Inc., John, Brooklyn, N. Y.

**Rivets, Tubular and Split**

Chicago Rivet & Machine Co., 1855 S. 54th St.,  
Cicero, P. O. Chicago, Ill.

**Riveters, Automatic Feed**

Chicago Rivet & Machine Co., 1855 S. 54th St.,  
Cicero, P. O. Chicago, Ill.  
Tomkins-Johnson Co., Jackson, Mich.

**Riveters, Multiple Spindle**

Grant Mfg. & Machine Co., Bridgeport, Conn.

**Riveters, Pneumatic**

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.  
Grant Mfg. & Machine Co., Bridgeport, Conn.  
Hanna Engineering Works, 1763 Elston Ave.,  
Chicago, Ill.

Hannifin Mfg. Co., 621 S. Kolmar, Chicago

**Riveting Machines**

Buffalo Forge Company, Buffalo, N. Y.  
Grant Mfg. & Machine Co., Bridgeport, Conn.  
Hanna Engineering Works, 1763 Elston Ave.,  
Chicago, Ill.

**Riveting Machines, Tubular and Split**

Chicago Rivet & Machine Co., 1855 S. 54th St.,  
Cicero, P. O. Chicago, Ill.

**Rod Cutters**

Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
Lewthwaite Machine Co., 311 E. 47th St., New York, N. Y.

**Rotary Tables**

Troyke, Alfred A., Cincinnati, Ohio

**Sanders**

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Stanley Electric Tool Div., New Britain, Conn.  
Stow Mfg. Company, Binghamton, N. Y.

**Sanders, Belt**

Boice-Crane Co., Toledo, Ohio

**Sanders, Disc**

Gaston Power Tools Co., Evergreen Park, Ill.

**Saws**

Black Diamond Saw & Machine Works, Inc.,  
Natick, Mass.

**Saws, Electric Hand**

Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Stanley Electric Tool Div., New Britain, Conn.

**Saws, Metal Cutting**

Racine Tool & Mch. Co., Racine, Wis.  
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

**Saws, Rotary Hack**

Stanley Electric Tool Div., New Britain, Conn.

**Saw Sharpening Machines**

Wardwell Manufacturing Co., Cleveland, Ohio

**Sawing Machines**

Boice-Crane Co., Toledo, Ohio  
Continental Machine Specialties, Minneapolis  
Delta Mfg. Co., Milwaukee, Wis.  
Wells Mfg. Corp., Three Rivers, Mich.

**Scraping Machines, Hand & Pneumatic**

Anderson Bros. Mfg. Co., Rockford, Ill.

**Screw Drivers, Electric**

Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.  
Cincinnati Electrical Tool Co., Cincinnati, Ohio  
Haskins Co., R. G., 623 S. California, Chicago  
Stanley Electric Tool Div., New Britain, Conn.  
Stow Mfg. Company, Binghamton, N. Y.

**Screw Machine Parts**

Modern Collet & Machine Co., Ecorse, Mich.  
Sutton Tool Company, Detroit, Mich.

**Screw Machine Products**

Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.

**Screw Machines, Automatic**

Brown & Sharpe Mfg. Co., Providence, R. I.

**Screwpieces**

Threadwell Tap & Die Co., Greenfield, Mass.

**Screws**

Hassall, Inc., John, Brooklyn, N. Y.  
Strong, Carlisle & Hammond Co., Cleveland, Ohio

**Screws, Transfer**

Nielsen Tool & Die Co., Berkley, Mich.

**Set Screws, Headless and Hollow**

Economy Machine Products Co., 5207 Lawrence Chicago, Ill.

**Moore, Geo. W., Boston, Mass.**

Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

**Standard Pressed Steel Co., Jenkintown, Pa.**

Triplex Screw Co., Cleveland, Ohio

**Shafts, Flexible**

Haskins Co., R. G., 623 S. California, Chicago  
Mall Tool Co., 7742 S. Chicago Ave., Chicago, Ill.  
Pratt & Whitney, Hartford, Conn.

Stow Mfg. Company, Binghamton, N. Y.

White Dental Mfg. Co., S. S., 10 E. 40th, N. Y. C.

## Buyers' Directory

**Shears, Bevel**  
Marshalltown Mfg. Co., Marshalltown, Ia.

**Shears, Hand**  
Armstrong-Blum Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.

**Shears, Hand**  
Beverly Shear Co., 3007 W. 110th Pl., Chicago

**Shears, Hand**  
Brenil Mfg. Co., Erie, Pa.

**Shears, Hand**  
Lewellen Machine Co., 311 E. 47th St., New York, N. Y.

**Shears, Hand**  
National Machine Tool Co., Racine, Wis.

**Shears, Hand**  
Whitney Metal Tool Co., Rockford, Ill.

**Shears, Power**  
Beatty Mch. & Mfg. Co., Hammond, Ind.

**Shears, Power**  
Buffalo Forge Company, Buffalo, N. Y.

**Shears, Power**  
Dreis & Krump Mfg. Co., 7440 Loomis, Chicago

**Shears, Power**  
Libert Machine Co., Green Bay, Wis.

**Shears, Power**  
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

**Shears, Power**  
Stanley Electric Tool Div., New Britain, Conn.

**Shears, Slitting**  
Beverly Shear Co., 3007 W. 110th Pl., Chicago

**Shears, Slitting**  
Buffalo Forge Co., Buffalo, N. Y.

**Shears, Slitting**  
Dreis & Krump Mfg. Co., 7440 Loomis, Chicago

**Shears, Slitting**  
National Machine Tool Co., Racine, Wis.

**Shears, Splitting**  
Marshalltown Mfg. Co., Marshalltown, Ia.

**Shears, Throatless**  
Beverly Shear Co., 3007 W. 110th Pl., Chicago

**Shears, Throatless**  
Marshalltown Mfg. Co., Marshalltown, Ia.

**Shears, Throatless**  
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

**Sheet Metal Machinery**  
Libert Machine Co., Green Bay, Wis.

**Sine Tables**  
Robbins Engineering Co., Detroit, Mich.

**Sleeves**  
Glenzer Company, J. C., Detroit, Mich.

**Sleeves**  
Midwest Tool & Mfg. Co., Detroit, Mich.

**Sleeves, Intermeshing**  
Durable Punch & Die Co., 2242 W. Grand, Chgo.

**Socket Head Cap Screws**  
Economy Machine Products Co., 5207 Lawrence Ave., Chicago, Ill.

**Socket Head Cap Screws**  
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

**Socket Head Cap Screws**  
Standard Pressed Steel Co., Jenkintown, Pa.

**Spacing Collars**  
Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.

**Special Tools and Machinery**  
American Tool Works, Inc., Hartford, Conn.

**Special Tools and Machinery**  
Beatty Mch. & Mfg. Co., Hammond, Ind.

**Speed Reducers**  
Albert Gear & Mch. Co., 4832 W. 16th St., Chgo.

**Speed Reducers**  
Chicago Gear Works, 440 N. Oakley, Chicago

**Speed Reducers**  
Cullinan Wheel Co., 1359 Altgeld St., Chicago

**Speed Saws, Universal**  
Wyzenbeck & Staff, Inc., 838 W. Hubbard, Chgo.

**Spindles, Precision Grinder**  
Maxwell Co., F. A., Bedford, Ohio

**Split Rivets**  
Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O., Chicago, Ill.

**Split Rivet Setters, Automatic Feed**  
Chicago Rivet & Machine Co., 1855 S. 54th St., Cicero, P. O., Chicago, Ill.

**Spoons & Nuts for Auto. Screw Machines**  
Sutton Tool Co., Detroit, Mich.

**Spot Welding Machines, Speed**  
Interstate Machinery Co., Chicago, Ill.

**Sprockets**  
Cullinan Wheel Co., 1359 Altgeld St., Chicago

**Stake Riveters**  
Marshalltown Mfg. Co., Marshalltown, Ia.

**Stampings**  
Hamilton Tool Company, Hamilton, Ohio

**Stampings**  
Southern Products, Independence, Mo.

**Stamps, Steel**  
Bates, H. O., Elizabeth N. J.

**Stamps, Steel**  
Colonial Broach Co., Detroit, Mich.

**Stamps, Steel**  
New Method Steel Stamp, Inc., Detroit, Mich.

**Static Balanc. Mchs.**  
Taylor Sales Co., Milwaukee, Wis.

**Steam Specialties**  
Strong, Carlisle & Hammond Co., Cleveland, Ohio

**Stools, Shop**  
Standard Pressed Steel Co., Jenkintown, Pa.

**Storage Racks**  
Stackbin Corp., Providence, R. I.

**Storage Racks**  
Yohe Supply Co., Canton, Ohio

**Straightening Machines**  
Whitney Metal Tool Co., Rockford, Ill.

**Structural Shop Machinery**  
Ryerson & Son, Jos. T., 16th & Rockwell, Chgo.

**Studs, Milled**  
Safety Socket Screw Corp., 4440 N. Knox Ave., Chicago, Ill.

**Surfaces, Wearing**  
Circle Tip Tool Corp., East Orange, N. J.

**Tables, Elevating**  
Midwest Tool & Engineering Co., Dayton, Ohio

**Tables, Spacing**  
Beatty Mch. & Mfg. Co., Hammond, Ind.

**Taps**  
Threadwell Tap & Die Co., Greenfield, Mass.

**Tap Extractors**  
Walton Co., Hartford, Conn.

**Tap Holders**  
Procunier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.

**Scully-Jones & Co., 1905 S. Rockwell St., Chicago, Ill.**

**Tappers, Electric Portable**  
Chi. Pneum. Tool Co., 6 E. 44th, N. Y. C.

**Tappers, Electric Portable**  
Cincinnati Electrical Tool Co., Cincinnati, Ohio

**Tapping Jigs, Univ.**  
Heuser Mfg. Co., 1638 N. Paulina, Chicago

**Tapping Machines and Attachments**  
Avey Drill. Mch. Co., Cincinnati, Ohio

**Tapping Machines and Attachments**  
Boice-Crane Co., Toledo, Ohio

**Tapping Machines and Attachments**  
Burke Machine Tool Co., Conneaut, Ohio

**Tapping Machines and Attachments**  
Errington Mechanical Laboratories, Staten Island, N. Y.

**Tapping Machines and Attachments**  
Etto Tool Co., 594 Johnson Ave., Brooklyn, N. Y.

**Tapping Machines and Attachments**  
Haskins Co., R. G., 623 S. California, Chicago

**Tapping Machines and Attachments**  
Procunier Safety Chuck Co., 14 S. Clinton St., Chicago, Ill.

**Tapping Machines and Attachments**  
Whitney Metal Tool Co., Rockford, Ill.

## Buyers' Directory

**Thermometers, Resistance Type**

Hill Test Lab., 150 W. Austin, Chicago

**Threading Machines, Automatic**

Grant Mfg. &amp; Machine Co., Bridgeport, Conn.

**Threading Tools**

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.

Rivett Lathe &amp; Grinder, Inc., Brighton, Boston

**Tool Holders**

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.

Michigan Tool Co., Detroit, Mich.

Western Tool &amp; Mfg. Co., Springfield, Ohio

**Tool Post Grinders**

Cincinnati Electrical Tool Co., Cincinnati, Ohio

**Tool Post Turners**

Colwell, S. G., Providence, R. I.

**Tool Reclaim. & Salvage**

Eastern Cutter Salvage Corp., Newark, N. J.

Master Tool Co., Cleveland, Ohio

Renn Tool Company, Detroit, Mich.

**Tools, Abrasive**

White Mfg. Co., S. S., 10 E. 40th, N. Y. C.

**Tools, Boring**

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.

**Tools, Carbide Tipped**

Super Tool Co., Detroit, Mich.

**Tools, Cutting**

Circle Tip Tool Corp., East Orange, N. J.

**Tools, Diamond Wheel Dressing**

Super Tool Co., Detroit, Mich.

**Tools, Lathe and Planer**

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.

**Tools, Machinists'**

Armstrong Bros. Tool Co., 308 N. Francisco Ave., Chicago, Ill.

Brown &amp; Sharpe Mfg. Co., Providence, R. I.

**Tools, Pneumatic and Main Parts**

Eastern Cutter Salvage Corp., Newark, N. J.

Master Tool Co., Cleveland, Ohio

**Tools, Steel Cutting**

McKenna Metals Co., Latrobe, Pa.

**Tools, Tungsten Carbide**

Metal Carbides Corp., Youngstown, Ohio

**Torch, Pumpless Gasoline**

National Safety Device Co., 836 Hubbard, Chicago

**Tracing Sheets**

Wade Instrument Co., Cleveland, Ohio

**Tube Flanging Machines**

Grant Mfg. &amp; Mch. Co., Bridgeport, Conn.

**Tubular Rivet Setters, Automatic Feed**

Chicago Rivet &amp; Machine Co., 1855 S. 54th St., Cicero, P. O., Chicago, Ill.

**Tungsten Carbide Tools**

Circle Tip Tool Corp., East Orange, N. J.

Michigan Tool Co., Detroit, Mich.

Super Tool Co., Detroit, Mich.

**Turning Tools**

R &amp; L Tools, Nicetown, Phila., Pa.

**Universal Joints**

American Tool Works, Inc., Hartford, Conn.

Chicago Gear Works, 440 N. Oakley, Chicago

**Used and Rebuilt Machinery**

Aaron Machinery Co., 176 Lafayette St., N. Y.

Acme Equipment Co., 128 S. Clinton, Chicago

Adams, Ogden R., Rochester, N. Y.

Bansbach Mch. Corp., 3845 W. Madison, Chgo.

Bennet-Rafkin Machine Tool Corp., 30 Church

St., New York, N. Y.

Bernstein &amp; Co., Geo. M., 12 S. Clinton, Chgo.

Bieser Mch. Co., Springfield, Ill.

Botwinik Brothers, Inc., New Haven, Conn.

Budlong Mch. Co., Detroit, Mich.

Braman Mch. Co., Cleveland, Ohio

Brooks Co., A. D., Boston, Mass.

Brown Machinery Co., St. Louis, Mo.

Brownell, Hazard, Providence, R. I.

Cincinnati Mch. &amp; Supply Co., Cincinnati, O.

Daniels, C. R., Milwaukee, Wis.

Davis Mch. Co., Toledo, Ohio

DeWitt Tool Co., 173 Grand St. N. Y. C.

Dony Mch. Co., D. E., Rochester, N. Y.

Eastern Machinery Co., Cincinnati, Ohio

Elyria Belt &amp; Mch. Co., Elyria, Ohio

Eimerman, Louis E. &amp; Co., 1761 Elston, Chicago

Eysley Machinery Co., E. L., 831 W. Evergreen

Ave., Chicago, Ill.

Falk Mill Supply Co., Inc., Rochester, N. Y.

Friedrich, Inc., Ed., San Antonio, Tex.

General Blower Co., 401 N. Peoria St., Chicago

Goldman &amp; Co., Harvey, Detroit, Mich.

Harris Electric Supply Co., 627 Wash. Blvd., Chgo.

Hill, Inc., Newark, N. J.

Hill, Clark Co., 642 W. Washington, Chgo.

Howarth Mch. Co., C. C., Detroit, Mich.

Hyman &amp; Sons, Joseph, Philadelphia, Pa.

Indianapolis Sons &amp; Supply Co., Indianapolis

Indianapolis Screw Products Co., Indianapolis

Industrial Machinery Co., Indianapolis, Ind.

Inland Machinery Co., Indianapolis, Ind.

International Mch. Co., Detroit, Mich.

Interstate Machinery Co., 109 S. Clinton, Chgo.

Iroquois Machinery Co., Buffalo, N. Y.

Johnson &amp; Sons Mch. Co., Wm. C., St. Louis

Jones Machine Tool Co., Cincinnati, Ohio

Klauber Machinery Co., St. Louis, Mo.

Lake Machinery Co., 656 W. Lake, Chicago

Lang Machinery Co., Pittsburgh, Pa.

Laurens Bros., Cincinnati, Ohio

Logeman, T. V., Normandy (St. Louis Co.), Mo.

Lowe Co., Chas. E., Hartford, Conn.

Lucas &amp; Son, J. L., Bridgeport, Conn.

McDonald Machinery Co., St. Louis, Mo.

Machinery Dealers Inc., New Haven, Conn.

Marr-Gaebler Mch. Co., Pittsburgh, Pa.

Miles Machinery Co., 2025 Genesee Ave., Saginaw, Mich.

Morey Machinery Co., Inc., 410 Broome St., New York, N. Y.

Morris Machinery Company, Inc., Newark, N. J.

Morton Mch. Co., H. L., Cleveland, Ohio

Moser Mch. Tool Sales, Milwaukee, Wis.

Nelson Machinery Co., Green Bay, Wis.

Northwest Auto Products Corp., Minneapolis, Minn.

Norton-Broadway Machinery Co., Cincinnati, O.

Nutmet State Mch. Corp., New Haven, Conn.

O'Brien Machinery Co., Philadelphia, Pa.

Osborne &amp; Sexton Machinery Co., Columbus, O.

Ott Mch. Sales, Inc., Detroit, Mich.

Passman Bros., 705 W. Washington, Chicago

Reeve-Fritts Co., 28 N. Clinton, Chicago

Regar, S. M., Tampa, Fla.

Reliance Machinery Sales Co., Pittsburgh, Pa.

Riverside Mch. Depot, Detroit, Mich.

Rosenkrantz &amp; Weisbecker, 2309-A Singer Bldg., New York City

Scott Mch. Inc., 1811 Carroll Ave., Chicago.

Segal Machinery Co., 117 S. Clinton St., Chicago

Simmons Machine Tool Corp., Albany, N. Y.

Standard Machinery Co., Grand Rapids, Mich.

Strong, Carlisle &amp; Hammond Co., Cleveland, O.

Sun Machinery Co., Newark, N. J.

Surplus Stock &amp; Mch. Co., Inc., 618 W. Lake St., Chicago, Ill.

Triplex Mch. Co., Pittsfield, Mass.

United Machinery &amp; Supply Co., St. Louis, Mo.

Victor Mch. Co., 130 S. Clinton, Chicago

## Buyers' Directory

## Used and Rebuilt Machinery—Cont.

Victor Mchly. Exchange, 251 Centre St., N. Y. C.  
 Vine, R. A., Detroit, Mich.  
 Wachs-Gregg Co., 1535 Dayton, Chicago  
 Webb Mchly. Co., O. T., Milwaukee, Wis.  
 West Penn Machinery Co., Pittsburgh, Pa.  
 White Mchly. Co., A. D., 108 N. Jefferson, Chgo.  
 Wigglesworth Machinery Co., Cambridge, Mass.  
 Winterhoff Mchly. Co., Detroit, Mich.  
 Zeeve, Alex, 2280 Woolworth Bldg., N. Y. C.

## Valves

Galland-Henning Mfg. Co., Milwaukee, Wis.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Ross Operating Valve Co., Detroit, Mich.

## Valves, Air

Air-Way Pump & Equip. Co., 625 Jackson, Chgo.  
 Bell Machine Co., Oshkosh, Wis.  
 Galland-Henning Mfg. Co., Milwaukee, Wis.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Hannifin Mfg. Co., 621 S. Kolmar, Chicago  
 Ross Operating Valve Co., Detroit, Mich.  
 Tomkins-Johnson Co., Jackson, Mich.

## Valves, Auto. Self-Open.

Bell Machine Co., Oshkosh, Wis.

## Valves, Foot, Lever &amp; Solenoid

Berkeley Engineering Co., Cleveland, Ohio  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Hannifin Mfg. Co., 621 S. Kolmar, Chicago  
 Nicholson Co., W. H., Wilkes-Barre, Pa.  
 Ross Operating Valve Co., Detroit, Mich.

## Valves, Hydraulic

Berkeley Engineering Co., Cleveland, Ohio  
 Galland-Henning Mfg. Co., Milwaukee, Wis.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Hannifin Mfg. Co., 621 S. Kolmar, Chicago  
 Ross Operating Valve Co., Detroit, Mich.

## Valves, Oil Relief

Fulfillo Specialties Co., Manchester, Ohio

## Valves, Operating

Berkeley Engineering Co., Cleveland, Ohio  
 Galland-Henning Mfg. Co., Milwaukee, Wis.  
 Hanna Engineering Works, 1763 Elston, Chicago  
 Hannifin Mfg. Co., 621 S. Kolmar, Chicago  
 Ross Operating Valve Co., Detroit, Mich.

## Variable Speed Devices

Continental Mch. Spec., Minneapolis, Minn.

## Vises, Air

Hannifin Mfg. Co., 621 S. Kolmar, Chicago

## Vises, Drilling Machine

Armstrong-Bunn Mfg. Co., 5741 Bloomingdale Ave., Chicago, Ill.  
 Armstrong Bros. Tool Co., 305 N. Francisco Ave., Chicago, Ill.  
 Desmond-Stephan Mfg. Co., Urbana, Ohio  
 Graham Mfg. Co., Providence, R. I.  
 Heuser Mfg. Co., 1638 N. Paulina, Chicago  
 Johnson Tool Co., Inc., East Providence, R. I.  
 L-W Chuck Co., Toledo, Ohio  
 Martin Tool & Die Works, Springfield, Ohio  
 Modern Mch. Tool Co., Jackson, Mich.  
 National Machine Tool Co., Racine, Wis.  
 Plunket Machine Co., 1823 W. Lake St., Chicago  
 Sheldon Mch. Co., 1629 N. Kilbourn, Chicago

## Vises, Machinists'

Desmond-Stephan Mfg. Co., Urbana, Ohio  
 L-W Chuck Co., Toledo, Ohio  
 New Britain Tool & Mfg. Co., New Britain, Conn.  
 Sheldon Mch. Co., 1629 N. Kilbourn, Chicago  
 Western Tool & Mfg. Co., Springfield, Ohio

## Vises, Milling Machine

Desmond-Stephan Mfg. Co., Urbana, Ohio  
 Graham Mfg. Co., Providence, R. I.  
 Hartford Special Mchly. Co., Hartford, Conn.  
 L-W Chuck Co., Toledo, Ohio  
 Plunket Machine Co., 1823 W. Lake St., Chicago  
 Sheldon Mch. Co., 1629 N. Kilbourn, Chicago

## Vises, Shaper

L-W Chuck Co., Toledo, Ohio  
 Plunket Machine Co., 1823 W. Lake St., Chicago  
 Sheldon Mch. Co., 1629 N. Kilbourn, Chicago

## Vises, Special

Modern Machine Tool Co., Jackson, Mich.

## Water Cooling Devices for Spot Welders

Eisler Eng. Co., Inc., Newark, N. J.

## Welders, Arc

Hobart Brothers Co., Troy, Ohio  
 Lincoln Electric Co., Cleveland, Ohio

## Welders, Arc, Diesel Driven

Lincoln Electric Co., Cleveland, Ohio

## Welders, Automatic, A. C.

Lincoln Electric Co., Cleveland, Ohio

## Welders, Arc, A. C. Type

Eisler Eng. Co., Inc., Newark, N. J.

## Welders, Arc, Engine Driven

Lincoln Electric Co., Cleveland, Ohio

## Welders, Gun

Acro Welder Mfg. Co., Milwaukee, Wis.

## Welders, Portable

Hobart Brothers Co., Troy, Ohio

Lincoln Electric Co., Cleveland, Ohio

## Welders, Resistance

Acro Welder Mfg. Co., Milwaukee, Wis.

Armuglo Co., Milwaukee, Wis.

## Welders, Seam

Acro Welder Mfg. Co., Milwaukee, Wis.

## Welders, Spot

Acro Welder Mfg. Co., Milwaukee, Wis.

Armuglo Co., Milwaukee, Wis.

Dyer Welder & Eng. Co., Kansas City, Mo.

## Welding Accessories

Hobart Brothers Co., Troy, Ohio

Lincoln Electric Co., Cleveland, Ohio

## Welding Electrodes and Holders

Hobart Brothers Co., Troy, Ohio

Lincoln Electric Co., Cleveland, Ohio

## Welding Electrode Tips

Eisler Eng. Co., Inc., Newark, N. J.

## Welding Generators, Arc

Hobart Brothers Co., Troy, Ohio

Lincoln Electric Co., Cleveland, Ohio

## Welding Machines, Electric Spot

Armuglo Co., Milwaukee, Wis.

Eisler Engineering Co., Inc., Newark, N. J.

## Welding Machines and Equipment, E. I. Arc

Hobart Brothers Co., Troy, Ohio

## Welding Protective Equipment

Lincoln Electric Co., Cleveland, Ohio

## Woodworking Machinery

Tannevitz Works, Grand Rapids, Mich.

## Wrenches, Pneumatic

Chi. Pneu. Tool Co., 6 E. 44th, N. Y. C.

## Blue Book Buyers' Service

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*Write directly to those offering the machine for sale, for prices and full descriptions. If what you seek is not advertised, write Hitchcock Publishing Company, Chicago, making known your wants on either new or used machinery and the publisher will gladly pass them along to the advertisers.*

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#### Aaron Machinery Co.,

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Drill, radial, 4' Mueller a. c., m. d.  
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Hammer, Pettingill, Nos. 1 and 2.  
Millers, Becker vertical Nos. 2, 2A, B-1, 5B.  
Miller, No. 2 Cincinnati universal, heads, like new.  
Pipe machines, Oster, Williams, 2", 4", 6", 8", m. d.  
Press, No. 10 Z. & H. percussion.  
Punch, Long & Alstatter multiple, 48" bet. housings, 72" bed, 175-ton ram pressure, wrt. 17-ton, 10" gap.  
Screw machines, Acme 53, 56, 76.  
Screw machines, B. & S. automatic, Nos. 0, 0G.  
Shapers, 16", 18", 20", 24".  
Welders, butt Federal, 15 k. w., 35 k. w.

### FOR SALE BY

#### C. C. Howarth Machinery Co.

1440 Franklin St., Detroit, Michigan

Grinder, 16" Persons-Arter, rotary.  
Grinders, No. 70, No. 75 Heald internal, m. d.  
Grinder, 12x24 Diamond hydraulic surface, m. d.  
Grinder, No. 3 Brown & Sharpe, planer type, m. d.  
Hammer, 500 lb. Bradley upright helve, m. d.  
Miller, No. 3 Cincinnati plain, high power.  
Press, 50 ton Lucas forcing.  
Press, No. 5 Toledo, o. b. t.  
Shaping saw, 6x6 Peerless univ., m. d.  
Thread mill, No. 3 Lees Bradner,

### FOR SALE BY

#### Alex Zeeve

2280 Woolworth Bldg., New York, N. Y.

Drills, radial—4' Dreses, gear-box motor drive; 3' Fosdick, gear-box, arranged motor drive.  
Hammer, power, 400 lb. Beaudry "Champion".  
Iron worker, combination universal, No. 16 Pels.  
Lathes, 27" x 14" Greaves-Klusman, q. c., 3-step cone, d. b. g.; 27" x 24" Lodge & Davis, l. c. g.; 16" x 6" Kimball-Walcott 12-apt grd. hd., q. c., s. p. o. others.  
Shaper, 34" Stockbridge heavy duty b. g. cone, auto. down feed; also others.  
Shear, alligator, No. 2 Doelger & Kirsten "All-Steel".  
Let us have your inquiries.  
We buy used machine tools.

### FOR SALE BY

#### Mayer Machinery Co.

742 Osage Street Fort Wayne, Ind.

Air compressor, Ingersoll-Rand, 475 cfm., syn., b. m. d.  
Air compressor, Worthington, 14x12, syn., b. m. d.  
Air compressor, Worthington, 15x16, Duplex, 1420 cfm.  
Air compressor, Curtis 9x9 & 8x8, Duplex.  
Automatics, 14", 14", 3 5/16" model G, m. d.  
Potter & Johnson 5A and 8A, m. d.  
Lathe, Prentiss, 14x6, 16x8, 18x8, grd. hd., m. d.  
Press, 554 Toledo, tie rod, roll feed, m. d.  
Press, Lucas 15 ton forcing, m. d.

### FOR SALE BY

#### Segal Machinery Company

117 S. Clinton St., Chicago, Ill.

Automatics: 5A & 6A Potter & Johnston and Fay's.  
Broaches, V-18 American; No. 3 LaPointe, 2 spindle.  
Gear hobs, No. 3 & No. 12 Barber-Colman, m. d.  
Grinder, No. 33 Abrasive, mot. dr., 5" cup wheel.  
Lathe, 12x5, 14x6, 16x8, 20x8, Mon-LeBlond—q. c. g.  
Millers, No. 2 B. & S. & Kemp. univ. fully equipped.  
No. 2 Garvin duplex; 24" Cincinnati duplex.  
Nibblers, Nos. 1H & 2 Campbell, 3" cap, 24" throat.  
Punch presses: No. 42 Toledo horn; No. 540 Max. Ams., str. str. —Back Gear, 5" stroke, No. 4 Bliss-Con.  
Radial drill, 34" American triple purpose, s. p. d.  
Screw machines, No. 4 & 6 W. & S. Plain & universal.  
Shapers, 16", 20", 24", 28", G. & E., Mil. and Amer.  
20" Rockford, hy-service, motor drive.  
Swedger, No. 4 Langlier, power infeed.

Partial list — Send us your inquiries.

### FOR SALE BY

#### Tranter Manufacturing Company

105 Water Street Pittsburgh, Pa.

Band saws, 36", 32", belt drive.  
Band saw, 16" Wallace, d. m. d.  
Moulder—6", 4 side (Houston).  
Moulder—8", 4 side (American).  
Moulder—10", 4 side (Fay & Egan).  
Saw, Beach, wood top 26" x 46, foot operated, cutoff, stationary rip.  
Saw, with c. s., all iron, top 32" x 44".  
Saw, no c. s., all iron, top 28" x 35".  
Shaper, Josias combination rip & crosscut saw and single spindle shaper, friction rev. c. s.  
Swing saw, 4' arm.  
All machines priced to move quickly.

## USED AND REBUILT MACHINERY

## FOR SALE BY

## D. E. Dony Machinery Co.

47 Laurelton Rd., - Rochester, N. Y.

Drill, Sibley 24" sliding head.

Gear hobber, Adams No. 1.

Hammer, Pettigell No. 2 bumping.

Lathe, Hamilton 16"x8", 2 spindles.

Lathe, Mullner 14"x8", taper attachment.

## FOR SALE BY

## Hazard Brownell, Machine Tools

350 Waterman Street, Providence, R. I.

Grinder, No. 2 Diamond, automatic surface.

Lathe, 40"x15" New Haven, 36" h. s.

Lathe, 27"x12" Sidney heavy duty, q. c. g.

Honer, Hutto s. vertical.

Milling machine, No. 5-C Becker.

Shear, 30" Pawtucket slitting, 7/16".

## FOR SALE BY

## General Blower Company

401 N. Peoria St., - Chicago, Ill.

## FLOWERS—FANS—EXHAUSTERS.

For Dust Collecting—Ventilating.

Oil and gas burners, cupolas, furnaces, etc.

Roots—Conversville and centrifugal blowers.

What are your blower requirements?

## FOR SALE BY

## Jones Machine Tool Company

Front &amp; Pike Sts., Cincinnati, Ohio

## LATHES

24"x30' Lodge &amp; Shipley, q. c., cone drive.

18"x8' Monarch grd. head, motor drive.

16"x10' Lodge &amp; Shipley q. c., cone drive.

18"x10' Hendey tie bar head, q. c., cone drive.

20"x14' Hendey, tie bar head, q. c., cone drive.

## MILLERS &amp; GRINDERS

No. 3 Kempthorn plain c. d. No. 2 W. &amp; M. Grinder.

No. 2 hyv. B. &amp; S. plain c. d. No. 3 W. &amp; M. Grinder.

No. 25 hyv. Ohio univ. c. d. No. 35 Abrasive m. d.

No. 4 Cincinnati, plain c. d. No. 1 W. &amp; M. Grinder.

No. 3-B Brown &amp; Sharpe plain, s. p. d.

## PRESSES

No. 6-A Toledo, open back inclinable.

No. 6-H Toledo, open back inclinable, geared.

No. 17 Stoll open back inclinable.

No. 6A Toledo incl. back geared.

Michigan s. s., dbl. Crank, 72" between housings.

All sizes inclinable and horning presses.

## SHEARS

48"x16 gauge Queen City, 12" gap.

52"x10 gauge Niagara, 18" gap.

52"x Niagara, 16 gauge, 15" gap.

## MISCELLANEOUS

Boring mill, #2" King vertical.

Hack saws, 12x15 &amp; 6x8 Racine; 6x6 Peerless.

Keyseater, No. 1 Davis motor drive.

Planer, 36"x12 Gray, 2 heads.

Shapers, 17 &amp; 21" Smith &amp; Mills &amp; 24" G. &amp; E.

4" Landis pipe machine.

11" Gleason bevel gear generator.

A LARGE STOCK ALWAYS ON HAND—  
LET US HAVE YOUR INQUIRIES

## FOR SALE BY

## Industrial Machinery Company, Inc.

2200-2300 Fletcher Av. Indianapolis, Ind.

Turret lathe, No. 2 Acme full universal, m. d. 3-60-226.

## FOR SALE BY

## Davis Machinery Company

1-3-5 So. St. Clair St. Toledo, Ohio

Brake, 4"x3/16" Chicago, power, leaf type, m. d.

Gear hobber, No. 12 Barber-C., dbl. over-a. rapid-trav.

Milling machine, No. 3 Cin. univ. h. p. div. hd.

Milling machine, No. 3 Kempthorn, univ. div. hd.

Thread miller, 6"x12" Pratt &amp; Whitney, belt drive.

## FOR SALE BY

## C. R. Daniels

1514 W. Capitol Drive, Milwaukee, Wis.

Horizontal boring, drilling and milling machine, No. 0 Giddings &amp; Lewis, 38" spdl. Table type, all standard dimensions and speeds. Motor driven with a. c. motor. Excellent condition. Price F.O.B. cars, \$3350.

## FOR SALE BY

## Ogden R. Adams

264-6 State St. Rochester, New York

Main 6374-5

1—Engraving machine, Gorton I-D, arranged for motor drive. New pantograph and spindle.

Reasonably priced.

## FOR SALE BY

## Bleser Machinery Company

209 N. Sixteenth St., - Springfield, Ill.

Lathe, 14"x6' Springfield, \$150.

Lathe, 36"x18" L. &amp; S., q. c., arranged m. d., \$1500.

Slotted, 13" stroke, 36" table, \$125.

Shaper, 32" American, arranged motor drive, \$225.

Trip hammer, 25 lb. Little Giant, \$75.

## FOR SALE BY

## Surplus Stock &amp; Machinery Co.,

620 W. Lake St., - Chicago, Ill.

Dieing machine, 20" John Henry &amp; Wright, roll feed.

Lathe, 18"x8" Whitcomb Blaisdell, q. c. g., m. d.

Lathe, 18"x8" American, quick change gear.

Lathe, 16"x6" Monotrol, timken bearing, mtr. in base.

Lathe, 24"x14" Putnam, geared head.

Shaper, 14" Gould &amp; Eberhardt.

Shaper planer, 26" openside, s. p. d.

Complete stock of metal working machinery.

Send us your inquiries.

## USED AND REBUILT MACHINERY

## FOR SALE BY

## Lang Machinery Company

## 28th St. &amp; A. V. R. R.

## Pittsburg, Pa.

Air compressors, Ingersoll-Rand XB-2, 600, 888, 1200 & 1500 cu. ft. 100 lb. pressure, motor drive.  
 Air comp., W N31 Sullivan, 350 c. f. syn. m. d.  
 Air compressors, (2) Sullivan, 480 c. f. 100 lb. b. m. d.  
 Air comp, 14" x 12" Ing. Rand, m. d., 464 c. f.  
 Automatics, 24" cone, 4 spindle, m. d.  
 Automatic, model "C" National Acme, 16", m. d.  
 Bolt cutter, 14" Landis, 14" x 3" Acme, sgl. bd., b. d.  
 Boring mill, 24" Bullard, rapid production, m. d.  
 Boring mill, 30" Bullard, threading attach., s. p. d.  
 Boring mill, 42" Bullard, 2 swivel heads, s. p. d.  
 Boring mill, 42" Bullard, "New Era", m. d. (2)  
 Boring mill, 42" Gishoff, 2 heads, r. p. t., m. d.  
 Boring mill, 42" Bullard, rapid production, m. d.  
 Boring mill, 52" Bausch, geared feeds, d. c., m. d.  
 Boring mill, 84" Pond, 2 heads, belt drive.  
 Boring mill, 96" Berts, rapid traverse, m. d.  
 Boring mill, 10" Niles, 2 heads, belt drive.  
 Boring mill, floor type, 3" bald Niles, m. d.  
 Brakes, power, 7" 10 ga., 8" 12 ga. D. & K.  
 Buffer and polisher, 75 h. p. Marschke, 220/3/60.  
 Cranes, (2) 8-ton Shaw, EOT, 150' span, 3 mtr.  
 Drill, heavy duty, No. 1 Baker, 34" capacity 28", s. p. d.  
 Drills, radial, 24" Cincinnati-Bickford, m. d.  
 Drills, radial, 32" Fosdick, s. p. d.  
 Drill, radial, 34" Cincinnati-Bickford, t. a., s. p. d.  
 Drills, upright, 14" to 32", belt drive.  
 Drills, 4-spdl. Avey No. 2, b. b., m. d.  
 Gear cutter, 48" x 30" Gould & Eberhardt, s. p. d.  
 Gear hobber, No. 18-H Gould & Eberhardt, s. p. d.  
 Generator, 50 KW Westinghouse, 75 h. p., a. c.  
 Grinder, disc, 15" Diamond, dbl. end.  
 Grinder, disc, No. 6-20 Besley, a. c., m. d.  
 Grinder, Sizematic No. 72-A3 Head, m. d.  
 Grinder, surface, No. 5 Grand Rapids, hyd. feed, m. d.  
 Grinder, T. & C. No. 2 Norton, belt drive.  
 Grinder, universal, No. 3 B. & S., m. d.  
 Hammer, 100 lb. Bradley cushion helve belt drive.  
 Hammer, power, 300-lb. Bradley upright helve.  
 Keyseaters, M. & M. No. 0-4", No. 4-24", No. 5-32".  
 Keyseater, Baker, No. 2 Baker, 34" cap, 2", b. d.  
 Keyseater, Baker, 36" stroke, 24" m. d.  
 Lathe, 12" x 6" Prentice, geared head, c. g., s. p. d.  
 Lathe, 16" x 8" Prentice, c. g., t. a., b. d.  
 Lathe, 20" x 8" S. B. & E., c. g., b. d.  
 Lathe, 20" x 24" Lodge & Shipley, c. g., b. d.  
 Lathe, 21" x 8" LeBlond, c. g., s. c., m. d.  
 Lathe, 21" x 10" LeBlond auto. mfg., belt drive.

Lathe, 24" x 10" Bradford, c. g., t. a., b. d.  
 Lathe, 24" x 14" Schumacher & Boye, c. g., c. g., b. d.  
 Lathe, 24" x 14" Lodge & Shipley, c. g., c. g., b. d.  
 Lathe, 24" x 16" Lodge & Shipley, c. g., t. a., m. d.  
 Lathe, 25" x 14" Schumacher & Boye, c. g., t. a., b. d.  
 Lathe, 35" x 18" American, p. c. g., t. a., b. d.  
 Lathe, 51" x 22" New Haven, triple geared, motor drive.  
 Lathe, roll, 54" x 24" Standard, motor drive.  
 Lathe, turret, 30" Steinle, 44" h. s., s. p. d.  
 Lathe, turret, 30" Steinle, grd. hd., 5" h. s., m. d.  
 Miller, plain No. 14 Brown & Sharpe, grd. feeds, b. d.  
 Miller, plain, No. 2 Cincinnati, tbl. 46-4 x 16", b. d.  
 Miller, plain, No. 24 LeBlond, tbl. 52" x 11-1/2", b. d.  
 Miller, plain No. 28 Ohio, table 52" x 11-1/2", belt drive.  
 Miller, plain, No. 3 Cincinnati, b. d.  
 Miller, plain, No. 4 LeBlond, table 72" x 16", belt drive.  
 Miller, plain, No. 24 Brown & S. tbl. 72" x 17", b. d.  
 Miller, vertical, model "B" Becker tbl. 57" x 12", s. p. d.  
 Pipe machines, Landis 14" to 72", belt drive, (2).  
 Pipe machines, Nos. 304-A, 306-A 308-A Öster, m. d.  
 Pipe machine, 8" Williams 24" to 8" motor drive.  
 Pipe machine, No. 114 Merrill, 24" to 12", motor drive.  
 Planer, 30" x 30" x 8" Niles-Bement-Pond, m. d.  
 Planers, 36" x 36" x 10" Cincinnati, 2 heads, belt drive.  
 Planer, 72" x 72" x 16" N.-B., 4 heads, rev. m. d.  
 Planer, openside, 48" x 16" x 12" D. & H. 3 hds., m. d.  
 Press, arch, No. 52 Toledo, str. 48", m. d.  
 Press, No. 93 Bliss, dbl. crk., str. 39", m. d.  
 Press, No. 83 Cleveland, stroke 24", roller feed, m. d.  
 Press, toggle, No. 34-A Bliss, stand.  
 Presses, wheel, 100, 200 & 250-ton Hydraulic.  
 Profilers, Nos. E3 and E4 Keller, motor drive.  
 Punch & S., Cleveland, 36" x 18", 14"-1", m. d.  
 Punch 26" Deep Throat, b. d.  
 Riveting hammer, No. 54B high speed, m. d.  
 Roll, bending, 7" x 4" Pyramid Type, b. d.  
 Saw, hack, 9" x 9" Racine, 3 speed, m. d.  
 Shapers, 16" 20" 24" & 28" belt or motor drive.  
 Shaper, 24" Columbia, d. b. g., gear box, m. d.  
 Shaper, openside, 26" Universal, Type A, m. d.  
 Shear, No. 14 Canton alligator, 24" square, m. d.  
 Shear, billet, No. FV-23 Pels, 3" round cap, m. d.  
 Shear, rotary, No. 16 Quietwork, 14 ga., 60" throat.  
 Shear, plate, No. 5 H. & J., 80" x 14" x 36" throat, m. d.  
 Shear, plate, No. 52 Morgan, 8" x 14", 24" throat, m. d.  
 Slotter, 6" Berts, table 20" dia. b. d.  
 Slotter, draw stroke, Baker, cap. 34" x 38", m. d.  
 Straightener, No. 1 Kane & Roach cap. 14" rd. m. d.  
 Welders, 200 amp. Gen. Elec., 300 amp. Lincoln.

## FOR SALE BY

## S. M. Regar

Office & Warehouse, 2nd Ave. & 15th St.  
Tampa, - - - - - Florida

Boring mill, Bickford, horizontal 8-speeds, 9' bed, table 33x60"..... 600  
 Broaching machine, LaPointe No. 3B, 56" stroke..... 400  
 Crane, Dragline, Bearcat, 1/2 yard..... 900  
 Crane, Dragline, Northwest 1/2 yard Diesel power, 2800  
 Crane, overhead, Link-Belt, 3-ton, with electric  
 motors, no bridge..... 600  
 Lathe, Bement Miles, 36" x 22" 6", loose change  
 gear, raising block to 44"..... 850  
 Lathe, Bridgeford, 27" x 9", c. c., d. b. g..... 550  
 Millers, No. 7 Becker, Lincoln type, (4)..... 250  
 Punch, multiple, Thos. Spacing Co. 1/8 thru 1/8,  
 variable spacing..... 1000  
 Riveter, Allen, Pneumatic, 19" reach, 9/16" gap..... 90  
 Shear, Stockbridge, 24", cone drive..... 600  
 Shear, double angle, Morgan Mfg., 6x6x1..... 500  
 Slotter, Bement Miles, No. 487, 153" stroke, p. f. .... 700  
 Welder, Wilson, 4 circuit, 150 amps..... 300

## FOR SALE BY

## Reliance Machinery Sales Company

## 1405 Brighton Place, N.S. Pittsburgh, Pa.

Air compressor, 8x8 Chicago, 139 cu. ft.  
 Angle shear, H. & J. double, 6x6x1", on turntable.  
 Borer, car wheel, for 42" wheels.  
 Boring mill, 51" Bausch, 2 heads, rapid traverse.  
 Bulldozer, No. 9 W. W., 34" stroke, crosshead 16x89".  
 Drill, radial, 6" Reed-Prentice, s. p. d.  
 Grinder, No. 2 Brown & Sharpe surface, motor drive.  
 Miller, No. 4 Cincinnati, plain, cone.  
 Miller, No. 8 B. & S., plain, 16" x 54", cone.  
 Miller, No. 6 Becker, 67" feed.  
 Planer, 36" x 78" x 12" Cincinnati, 2 heads.  
 Press, No. 2 Toledo, o. b. i., 44" stroke.  
 Press, consolidated, a. s. 8" shaft, 64" stroke.  
 Press, No. 82 C. Toledo dbl. crank, 5" shaft, 44" wide.  
 Presses, o. b. i., Nos. 4 & 5 Toledo.  
 Shapers, 16", 20" and 24", various makes.  
 Shear, open front bar, 7x1 flats.

What do you need? What have you for sale?

## USED AND REBUILT MACHINERY

## FOR SALE BY

**The Warner Elevator Mfg. Company**  
**2613-31 Spring Grove Ave., Cincinnati, O.**  
 Niles radial drill, -54" arm, back geared, power rail elevating device, four-step cone drive. In very good condition. Low price for immediate sale.

## FOR SALE BY

**The Reeve-Fritts Company**  
**28 N. Clinton St., Chicago**

Boring machine, No. 1 Barrett, cylinder. Cut-off machine, 12" Peter's abrasive. Gear hobber, No. 1 Adams Farwell. Grinder, No. 2 Grand Rapids, universal. Grinder, No. 1 LaSalle tool & surface. Press, No. 2 Rockford, o. b. Press, No. 3 Bliss (solid back). Screw driver, No. 2 Reynolds. Screw machine, 1" Cleveland automatic. Taper, No. 1 Garvin, 1" vertical.

## FOR SALE BY

**Chas. E. Lowe Co.**  
**174 Pearl Street, Hartford, Conn.**

1" Model G Gridleys, ser. 16803 m. d. (3)  
 1" Model G Gridleys, ser. 10104 m. d. (2)  
 1" Model G Gridleys, ser. 10149 m. d. (4)  
 2" Model F Gridleys, m. d.  
 Nos. 24, 452 New Britain chucks.  
 2" 4" Model "A" Cleveland, b. d.  
 2" 4" Model "A" Cleveland, var. m. d.  
 4" Model J, s. a. Gridley.  
 No. 00, No. 0, No. 2 Brown & Sharpe.  
 No. 53, No. 85 Acme, m. d.  
 1" Model C 5 spdl., Acme's, m. d. (2).  
 40 sets of round collets and pushers for 1" G Gridley.

## FOR SALE BY

**Joseph Hyman & Sons,**  
**Tioga and Almond Sts., Philadelphia, Pa.**

WORLD'S LARGEST STOCK  
 POWER PRESSES

No. 200C Toledo, gap, dbl. crank, tie rod, 6" - 7" crank. No. 6K Bliss, double crank, tie rod, 74", crank 6" - 8". No. SG 115 Ferracute, dbl. crank, tie rod, 69", crk 52". No. 3C Bliss (2) double crank, tie rod, 54", crk 5" 52". Bliss double crank, gap, grd. 78" crank, bed 97" x 18". No. 138 Bliss, double crank, flywheel, 79", crank 5". Nos. 93B, 92D, 91C Toledo dbl. crank presses. Nos. 54, 55, 57, 57A, 59 Toledo, geared straight side. No. 58A Toledo, geared, straight side. No. 58G Garrison, tie rod, straight side, 8" crank. Nos. 55, 58B tie rod, 34C & Bliss toggle presses. No. 144T Toledo and No. 8 Bliss toggle presses. No. 910B Stoll, toggle press, 7" 8" crank, 84" draw. No. 40 & 39B Bliss, Nos. 14 & 12 Toledo horning. No. 512 Niagara, geared, straight side, 8" shaft. Nos. 652 Toledo, 250 ton knuckle joint, coining. 150ton No. EWG 52 Ferracute, 75 ton EG51 Ferracute. 500ton American Can Coining, 75t. No. E51, Ferracute. 200ton No. 59 Bliss, 250 ton Waterbury F, coining. 100 ton No. 21 Bliss, 50 ton No. 3 Bliss coining. No. 3W Bliss wiring presses, (2). Squaring shears, various sizes. Gang slitter, 60", Braddock, type H. These and hundreds of others of popular makes and sizes, are in stock at our warehouse here.

Rebuilt and Guaranteed.

## FOR SALE BY

**Porter-Cable Mch. Co., Syracuse, N. Y.**  
 Automatic chucker, 6A Potter & Johnston, rebuilt. Balancer, Gisholt dynamic, 24" swing x 40" length. Milling machine, No. 24 B. & S., 8" table, good cond.

## FOR SALE BY

**H. F. Wolnick Machinery Company**  
**9 S. Clinton Street, Chicago, Ill.**

Drill radial, Fosdick 4" geared box. Lathe, turret, No. 5 Foster s. p. d., wire feed, collets, Oil separator, 1/2 bushel. Power saw, No. 5 Marvel. Plain mill, No. 4 Cincinnati single pulley drive. Plain mill, 24" x 24" x 18" Osterlein cone head. Planers, 24" x 24" & 7" (2). Press, No. 7 Bliss, 60" bet hours, 6" str., grd., t. r. b. d. Press, No. 3 R. & K., o. b. l. 2" stroke. Many other machines in plant being liquidated.

## FOR SALE BY

**General Machinery Corporation**  
**140 Federal St., Boston, Mass.**

Drill, Fairbanks 20" B. & T. Drill, Leland-Gifford floor, 10,000 r. p. m. Lathe, Sloan & Chase bench, 8" capacity. Miller, Becker No. 28, plain. Miller, Milwaukee No. 1, universal, cone. Planer, Gray 22" x 5", c/s. Planer, Gray 27" x 7", c/s.

## FOR SALE BY

**Wm. C. Johnson & Sons Machy. Co.**  
**1211 Hadley St., St. Louis, Mo.**

Air compressors, 15 in stock. Automatic, cone, 1" 1/2", 4 spindle, complete. Bolt threaders, 1" 1/2" & 2" Acme. Boring machine, 48" Bettis. Boring mills, 6" - 8" & 8" - 12" Bettis, 44" Niles. Die slotter, Garvin, 34" stroke. Drill, Allen 4 spindle, No. 3 taper, 12" overhang. Drill, No. 2 Fox, 6 spindles. Drill, Moline hole hog, 8-sp., No. 4 Morse taper. Drill, radial, 4" Dresses and 4" Fosdick, 34" Mueller. Gear hobber, No. 3 Adams. Hammers, 300 lb. Beaudry, 75 lb. Bradley, 50 & 100 lb. Little Giant. Lathe, 14" x 6" Hendey belted m. d. taper attach. Lathe, 18" x 8" Boye & Emmes, q. c. Lathe, 27" x 16" L. & S. q. c. g. Miller, Cin. production type, 57" x 11" table. Miller, Pratt & Whitney, spline. Miller, No. 4 Le Blonde universal cone drive. Pipe machine, 2" - 4" - 6" - 8" - 12". Press, No. 58 Toledo, double geared, 30" x 30". Press, No. 79 Toledo, o. b. special, 34" stroke. Presses, Nos. 2, 3 & 4 Marshalltown. Presses, 3, hydraulic pump & accumulator. Press brake, 10" for 10 ga. Ohl. Press brake, 8" 6" for 14 ga. m. d., 95% new. Punch, Cleveland E. F. art jaw, 47" thr., with Lysham spacing table, m. d., one-man control. Rolls, corrugating, 24" dia. 13" removable dies. Roll, plate straightening, H. & J. No. 2, like new. Saw, 12" x 12" Racine and Nos. 2 & 1 Marvels. Shapers, 12" - 16" - 20" - 24". Sq. shears, No. 100 Bliss, 16". Punches, shears, bulldozers. Testing machine, 100,000 lb. Riehle. Large stock guaranteed electric motors. Any size.

## USED AND REBUILT MACHINERY

## FOR SALE BY

Eastman Kodak Company

Kodak Park

Rochester, N. Y.

Lathe, Schumacher & Boye, 40" x 14" qcg, dblg, ta. bd.  
Planer, Pond, 40" x 40" x 12", 4 heads, bd.  
Press, Bliss, automatic feed, 202-S, 4 die slides.

## FOR SALE BY

Nelson Machinery Co., Green Bay, Wis.

Boiler, 300 h. p. Edgemor water tube.  
Bolt cutter, 24" National geared head, motor drive.  
Gear unit, Falk 124 H. C. Herringbone, 600 h. p., 200  
to 1800 r. p. m.  
Generators (2), 200 KW Westinghouse 3-60-2300-514  
r. p. m. belted.

## FOR SALE BY

E. L. Klauber Machinery Co.

320-322 South Third St. St. Louis, Mo.

Band saw, metal, 12x12 visc capacity, motor drive.  
Bending and flanging machine, Cameron, No. 78 auto.  
Centering machines, revolving and stationary hd. types.  
Drills, 75; 1, 4, 6 spindle, radial, 24" Carleton sensitive.  
Grinder, No. 2 Brown & Sharpe cutter & reamer, m. d.  
Hammer, Bradley 25 lb. upright wrap.  
Lathes, 18" Lehman, Monarch, Bradford d.b.g., q.c.g.  
Lathes, turret, No. 9; No. 1; No. 2; No. 3 and No. 4.  
Millers, 9" Brown & Sharpe; No. 1 Kempsmith plain;  
Newton horizontal production—16x55 table, No. 1  
Knight vertical.  
Polisher and grinder, belt, 14" Peerless.  
Screw machine, automatic, Cleveland 4-18 model A.  
Shaper, 24" Cincinnati, universal tool room, m. d.  
Spot welders, 20 and 25 K. W. National.

## FOR SALE BY

Marr-Galbreath Machinery Company

Air compressors, 7x8" Chicago, NSB.  
Air compressors, 9x8" Sullivan, WG-6.  
Air compressor, 9" x 8" Sullivan, m. d.  
Blowers, (furnace) No. 2 Knight; No. 3 American.  
Blower, pressure, No. 11-PB Am. 14375 cfm., m. d.  
Boring mill, 30" Bouldard vert., threading attach., b. d.  
Brake, 8" x 12 ga. Chicago, power, belted.  
Brake, crimp and corrugating, 10" x 16 ga. Keene.  
Crimping and corrugating machine, 10" x 16 ga. Keene.  
Drill, radial 34" Bickford g. b. m. d.  
Drill, radial, 6" Amer. univ., g. b. m. d.  
Drill, radial, 6" R. P. plain, g. b., s. p. d.  
Drill, 3" radial, Dresser rd. swing table, t. a.  
Drills, gang, 3 and 4 spindle, 1 to 4 MT.  
Exhauster, No. 35 Buffalo, outlet 12x14", m. d.  
Fan, ventilating, 24" American, m. d., 1/60.  
Fan, 24" Sirocco, 4940 cfm. 4" wp., m. d.  
Forging machine, 14" Acme, all steel, side shear.  
Furnace, gas fired, Tate-Jones "GOF", I. D. 164" x 11".  
Furnace, T. J. 25x23x17", I. D. 17000 f.  
Grinder, No. 10 B. & S., plain, s. p. d.  
Grinder, plain No. 10 B. & S., s. p. d., collet att.  
Grinder, No. 21 Landis, plain 10x8x9", c. s.  
Grinder, tool & cutter No. 14 Cincinnati, plain.  
Grinder, portable surface, No. 8 A.O. motor, 3/60.  
Grinder, univ. C. & R. No. 3 B. & S.  
Grinding spindle, Excello No. 39, bracket 5002.  
Hammers, 50 lb. Boss, No. 2, with dies, belted.  
Hammer, 100 lb. Little Giant, belted.  
Hammer, 200 lb. Bradley upright helve, motor drive.  
Hammer, 300 lb. Heady "Champion" b. d.  
Hammer, 400 lb. Bliss board drop (rebuilt).  
Hammer, 1000 lb. Chbg. steam drop, double frame.  
Hoists, 10-ton Euclid, 3/60/220 (2).  
Keyseater, No. 3 M. & M.  
Keyseater, Morton, cap. 24" x 24", s. p. d.  
Lathe, 78x30", Dalton, type B-4, screw cutting.  
Lathe, 15" x 22" x 8" Sebastian gap bed cone.  
Lathe, 16" x 22" x 8" Fay & Scott, sliding bed, gap, cone.  
Lathe, 18" x 8" L. & S., d. b. g., Cullman, m. d.  
Lathe, 20" x 8" LeBlond q. c. g., 5-step cone.  
Lathe, 20" x 8" LeBlond q. c. g., t. a., 5-step cone.  
Lathe, 20" x 12" American geared head, m. d.  
Lathe, 22" x 12" Rahn-Larmont, pl. change gears, t. a.  
Lathe, 24" x 10" L. & S., 5-step cone, q. c. g.  
Lathe, 24" x 20" L. & S., selective head, m. d., t. a.  
Lathe, 24" x 20" L. & S., selective head, m. d., t. a.  
Lathe, 26" x 10" Wolcott, q. c. g., d. b. g., 28" h. s.  
Marking machine, No. 3 Noble & Westbrook.  
Milling mach. univ. No. 3 Kempsmith, cone.  
Milling machine, univ. No. 4 B. & S. cone.  
Milling machine, pl. No. 3 Cincinnati, cone.  
Nailing machine, No. 6 Morgan, 8-track, m. d.  
Nibbling machine, No. 1 Campbell, 6" thr. 3/16".

57 Water St.,

Pittsburgh, Pa.

Nut runner, No. 4 B. & D. 3", motor 110 v.  
Pinion cutter, No. 3 S. & C., auto, 1" x 1".  
Pinion cutter, No. 3 Sloan & Chase, capacity 1x1".  
Pipe machine, 4" Williams, cap. 4" to 4", m. d.  
Pipe machine, 18" Wieland "Standard", m. d.  
Planer, 26" x 26" x 8" Niles, 1 hd., belt m. d.  
Planer, 30" x 30" x 8" Cincinnati, 1-rail, 1-s. h., m. d.  
Presses, 6 & 7 Bliss d. c., t. r., b. g.  
Presses, No. 21 Bliss o. b. i., stroke 1", m. d., (2).  
Presses, No. 18 Bliss, o. b. i., 14" & 2" stroke.  
Press, hyd. vert., 30-ton Lourie, 18" between posts.  
Press, foot, Lewthwaite, wt. 400 lb., (2).  
Press, horn, No. 162 Bliss, plain, stroke 14".  
Presses, No. 22 Bliss o. b. i., stroke 2" (weided).  
Presses, United 56-ton o. b. str. 14" shear blade, m. d.  
Press, o. b. i. No. 9 Thomas, 14" str., 650 lb. (new).  
Press, o. b. o. No. 3 Perkins, pl. str. 14".  
Press, o. b. i. No. 1 Thomas, 2" stroke, m. d.  
Press, punch, P-2, Ferracute, m. d.  
Press, sgl. crank, 594 Tuited, str. 8".  
Press, wheel, 60-ton W. S. 34" x 38".  
Press, wheel, 200 ton, 93" x 36", pump, m. d.  
Punch & shr., comb., No. 5 Buffalo, hand, cap. 4" x 1".  
Punch & shear, S. E., 18" tht. 4" x 8"; No. 3 L. & A.  
Riveter, No. 102 Grant, motor drive.  
Riveters, No. 3-A, and 120 Grant, m. d.  
Riveter, No. 3-A, high speed, cap. 4", m. d.  
Rolls, 30" x 6" United, 2-rolls (for leather).  
Saw, metal, 4x4" Napier, m. d., (2).  
Screw machine, turret No. 1 Garvin, w. f.  
Shaper, 15" Blount, (planer drive).  
Shaper, 20" Kelly, b. g. crank, cone.  
Shaper, 21" Averbeck, b. g. cone.  
Shaper, 24" Milwaukee b. g., V-ram.  
Shaper, 24" American, gear box, motor 3/60/220.  
Shaper, 28" American b. g., gear box, m. d.  
Shear, alligator 18", 8" blade.  
Shear, alligator, No. 46 Beloit, cap. 1".  
Shear, B-38 Stanley Unishear, cap. 4", m. d.  
Shear, O-36 Stanley Unishear, cap. 14 ga., m. d.  
Slotted, 34" Rhodes, bch, rotary table.  
Speed reducers, 1 h. p., 96:1; 8 h. p. 4:1.  
Sprus cutter, No. 172 Bliss, belt.  
Tapping machine, 8" Pratt & Whitney, b. d.  
Testing machine, 1000 lb. Olsen hyd., hand.  
Testing machine, 100,000 lb. Riehle, m. d.  
Tiering machines, 600 and 1000 lb. Economy, hand.  
Tumbling barrel, No. 2 Baird, tilting.  
Tumbling barrel, 14x18x20", Hanson-Van Winkle.  
Turret lathe, 24" x 14" Gisholt.  
Turret lathe, 24" x 26" Acme, s. p. d.  
Turret lathe, 18" x 6" Springfield, Fox Monitor.  
Upsetter, 14" Acme, all steel.  
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## Acme Equipment Company

128 So. Clinton St., - - Chicago, Ill.

Apron brake, Chicago steel power, 4 ft., 1" cap.  
 Drills, radial, 24, 3, 3½, 4 ft. arms.  
 Grinder, Gardner 53" horizontal, b. b. m. d.  
 Lathes, Rockford q. c. g. 14" x 8"; So. Bend 12" x 5".  
 Milling machines, No. 1 Wisc., No. 1B Milwaukee.  
 Presses, punch, o. b. i. No. 00, 0, 1, 2, 3, 4.  
 Shapers, 14, 16, 18, 20, 24" stroke.

## FOR SALE BY

## Wigglesworth Machinery Co.

199 Bent Street Cambridge, Mass.

Boring mill, 3" bar Lucas.  
 Boring mill, 24" Bullard, side head.  
 Drill, 4-spindle Leland-Gifford.  
 Keyset machine, Nos. 56 and 57 Waterbury-Farrell.  
 Grinder, No. 12 Landis, universal.  
 Grinder, 14" model B. Pratt & Whitney, m. d.  
 Grinder, No. 33 abrasive, m. d.  
 Grinder, No. 16 Blanchard, m. d.  
 Grinder, No. 2 Brown & Sharpe-Reid.  
 Grinder, 18" x 6" Norton.  
 Lathe, 18" x 12" Walcott, q. c. g.  
 Lathe, 18" x 12" Rockford, q. c. g.  
 Miller, No. 3A heavy Brown & Sharpe univ., m. d.  
 Miller, No. 4 Knight, jig borer, m. d.  
 Planers, 42" x 12" x 10" Detrick & Harvey (2).  
 Press, No. 3 V & O, back geared, m. d.  
 Press, No. 21B, Bliss inc.  
 Radial, 4" American-Bickford, s. p. d., enc. head.  
 Radial, 4" Cincinnati-Bickford, s. p. d., enc. head.  
 Spline millers, 6" Taylor & Fenn (4) m. d.  
 Spline miller, 4" Pratt & Whitney.  
 Turret lathes, No. 2A & No. 3A Warner & Swasey.  
 Turret lathes, Nos. 4, 5 & 6 Warner & Swasey, gd. hd.  
 Turret lathe, No. 3 Foster, timken bearing, m. d.  
 Turret lathe, No. 4 Brown & Sharpe, wire feed.

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 Grinders, Head No. 20-8" and 16" rotary.  
 Grinder, No. 10 Brown & Sharpe s. p. d., plain.  
 Grinders, Norton 6x12 and 10x36 plain.  
 Headers, No. 06 Manville, d. s. a. d., No. 00 s. s. d.  
 Header, Wat. Far. No. 8 d. s. d.  
 Lathe, Head 20" x 12" roke head.  
 Millers, Cin. Nos. 2 and 3 a. p. d., plain.  
 Miller, Cincinnati No. 8, cone, plain.  
 Miller, No. 1, Cincinnati universal complete.  
 Millers, Superior slot millers, m. d. (like new) (3).  
 Presses, No. 34-A toggle Bliss, No. 74 Bliss.  
 Press, B. & D. No. 2 heavy, cut and carry.  
 Press, Wat. Farrel, 180 ton knuckle.  
 Press, No. 84, Cons. s. side, geared.  
 Rolling mill, 10" x 8", Wat. Farrel.  
 Rolling mill, 4" x 7", Buffalo.  
 Shaper, P. & W. 6" vertical, m. d.  
 Shaper, Potter & Johnson 15" m. d., univ.  
 Shapers, Springfield 18" m. d., (2).  
 Shapers, American 24" s. p. d.  
 Shaper, Cincinnati 24" m. d.  
 Tappers, Anderson dial feed, m. d.  
 Tappers, Hart & Heg. high speed, dial feed.  
 Many other lathes, presses, shapers, etc.

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## Standard Machinery Co.,

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Automatic, 14" Gridley, model F.  
 Boring mill, 42" Bullard vertical.  
 Boring mill, 24" Lucas horizontal.  
 Drill, 25" Barnes power feed back geared.  
 Drill grinder, Sellers 9" capacity.  
 Grinder, No. 24 Walker surface.  
 Grinder, No. 4 Badger disc, motor drive.  
 Lathes, Porter-Cable Mfg. (10).  
 Miller, model C-1 Becker heavy vertical.  
 Saw, 6" Higley cold metal.  
 Shaper, 24" Hamilton.

## FOR SALE BY

## Russell Machine Co.

438 Oliver Bldg. Pittsburgh, Pa.

Boring mill, Bullard, 42" New Era type.  
 Boring mill, 42" Gisholt, 2 heads., m. d.  
 Boring mill, 10" Niles vertical.  
 Gear hobber, No. 18H Gould & Eberhardt, s. p. d.  
 Hammer, 5000lb. double frame NBP steam.  
 Lathe, 26" x 12" Chard, hyd. duty, q. c. g., t. a.  
 Lathe, 26-48" x 14" McCabe 2-in-1 l. c. g., b. d.  
 Lathe, 52" x 22" Pond triple geared.  
 Lathe, turret, 30" Steinle, 8" h. s.  
 Pipe cutting and threading machine 6" Merrill.  
 Planer, Cincinnati 36" x 36" x 10' table.  
 Press, No. 5 Bliss type, 2" stroke, b. d.  
 Press, wheel, 200-ton Niles, b. d.  
 Punch-press Cleveland grd. roller feed, 100 ton pr.  
 Saw, lumber, Racine 2" x 9" m. d.  
 Shaper, 24" Gould & Eberhardt.  
 Shear, alligator, United cap. 5" square.  
 Shear, plate, No. 5 H. & J. cap. 90" x 4" m. d.  
 Soree cutter, No. 7 Z. & H. m. d. cap. 14" dia.  
 Upsetting machines, 24, 32, 4 and 5" Ajax iron bed.

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Automatics, 3/4", 7/8", 2 1/4" single spindle Cleveland.  
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 Chucking machine, No. 2-A W. & S. factory rebuilt.  
 Chucking machines, No. 24 & No. 32 New Britain, b. d.  
 Crankshaft Grinder, 16" x 48" Norton double end drive.  
 Drill grinder, No. 51 Oliver with 220 volt, a. c. motor.  
 Drill, No. 4 Bausch 28-spindle multiple.  
 Drill, 4" - 11" column Amer. pi. radial, gr. box, s. p. d.  
 Gear hobber, No. 1 Schuchardt & Schutte c. s. belt dr.  
 Gear shapers, type 624 and type 6 Fellows.  
 Grinder, No. 12 Bryant int. with 220 v., 2 ph., 60 cy. mtr.  
 Grinder, Gardner No. 1, univ. with 220 v., 3 ph., 60 cy.  
 motor on spindle pump and piping with pan.  
 Grinder, 12" x 16" Landis, complete.  
 Milling machine, No. 0 Owens, 3-step cone, belt power  
 feed, t. s.  
 Press, No. 512 Niagara straight side, 6" stroke.  
 Radial, 2" - 8" column American plain, gear box, single  
 pulley drive.  
 Screw machine, No. 1 W. & S. hand, automatic chuck,  
 bar feed, countershaft drive.  
 Screw machine, No. 2 B. & S. hand feed, automatic  
 bar feed, countershaft drive.  
 Simplimatic, Gisholt, practically new.  
 Turret lathe, 24" Gisholt double bk. grd., 4-jaw chuck.  
 Turret, 24" x 26" Greenlee flat, with automatic chuck.

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Bending roll, 30"x15" Southwark, drop end housing. Chuck, magnetic 12" wide by 6" long, Walker, 110 v. d.c. Drill radial, Amer. 3" sens., tapping attachment. Gas furnace, No. 4 American, door opening 8"x14". Grinder, No. 14 Pratt & Whitney b. b., vert. surface. Grinder, No. 16 Blanchard high power vert. sur., m. d. Grinder, Mumford-Dixon 3 wheel tool grinder. Hammer, No. 4-B Hazel, motor drive, a. c. Lathe, 17"x38" Le Blond heavy duty, 3 step cone, d.b.g. Lathe, 18"x38" Lodge & Shipley, geared head. Lathe, 20"x38" Cleveland, geared head. Lathe, 26"x14" Bridgewater, geared head, m. d., taper. Lathe, turret 24"x24" J. & L., steel head, bar equip. Lathe, turret 24"x36" J. & L., bar and chucking equip. Miller, plain No. 24 B. & S., table work surf. 72"x12". Miller, No. 1 Cincinnati plain, cone drive. Millers, No. 2 Cincinnati plain, high power, s. p. d. Miller, 48" Cincinnati automatic duplex, motor drive. Multiple punch, No. 5 H. & J., 34" between housings. Pipe machine, 4" Williams, motor drive. Saw, 6" Racine power hack saw. Shears, squaring 10"x14" and 12"x3/16" Ohl. Shear, squaring 10"x3/16" Loy & Nawrath, arr. m. d.

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119 Broad St. Boston, Mass.

Sheet metal working machinery, hand and power. All types of new and reconditioned equipment. Apron brakes, press brakes, shears, folders, Bending rolls, corrugating rolls, forming rolls, Punches, beaders, rotary machines, stakes, etc.

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2308 Singer Building, New York, N. Y.

Boring mills, 84" Miles vert., rap. trav., m. d. Drill, multiple spdl., No. 30 Natco, m. d., 20" round hd. Gear cutter, 110" Newton, motor drive. Grinder, Cincinnati 24", face mill, motor drive. Keyseater, No. 20 Catlin, m. d. Lathe, 60"x22" Gleason, motor drive. Lathe, 42"x18" Pittsburgh, quick change gear. Planer, 72"x12"x22" N. H. P., 4 heads, rev. m. d. Planer, 96"x12"x26" Pond, 3 heads, m. d. Rolls, angle bending, 6"x8"x4" cap., m. d.

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**West Penn Machinery Company**

Air compressors, 30 to 2500 cubic feet. Air compr., portable gas I-180 cu. ft. Blower, No. 4 Roots, capacity 2110 c. f. m. Bolt cutters, 2" & 3" Acme, b. d. Boring mill, 42" Bullard, 2 heads. Boring mill, 64" Bettis, 3 heads, belt drive. Bulldozers, Nos. 2, 4, 6, 9, 28, & 30. Crane, 10 ton Whiting, 43' Span, 220 cu. ft. Crusher, jaw, No. 4 Champion, b. d. Drill, 4" radial, Morris, speed box. Drill, radial 6" Reed-Prentice, single pulley drive. Drills, 4 spindle Allen, No. 2 m. t., s. p. d. Drill, multiple 25 spindle No. 30 Natco. Drills, upright 10" to 36". Engine, gas, 20 horse power Bessemer. Flanger, McCabe, 3" capacity, dies. Flanger, No. 208 Niagara, 10 Ga. b. d. Gear cutters, Nos. 5 & 6 B. & S. 60" & 72" m. d. Gear cutters, 11", 18" & 24" Gleason. Gear tester, bevel 18" Gleason. Grinders, centerless Heim, m. d., 220/3/60. Grinder, roll, No. 31 Oliver, 18", m. d., 220/3/60. Grinder, knife 10" Bridgeport, m. d. Grinder, roll, Farrel 28"x7". Grinders, D. E. 2-3 & 5 h. p., 220/3/60. Grinder, T. & C. No. 1 & No. 2 Cincinnati, m. d. Grinder, disc, No. 8-20" Besly, belt drive. Grinder, disc, No. 4 Gardner, motor drive, 220/3/60. Groover, No. 275-A Niagara, 6", 16 ga. motor drive. Hammers, 50 lb., 75 lb., 100 lb., 200 lb. Upright. Hammer, power, 100 lb. Bradley cushion helve. Hammers, Nos. 2-B, 3-B, 4B, 6-B, Hazel. Hammers, steam, forging & drop. Keyseater, No. 2 Mitts & Merrill, belt drive. Lathe, 20x12 S-B. E., t. a. q. c. g., b. d. Lathe, 26"x12" Putnam, q. c. g., b. d. g. Lathe, 42"x16" Schumacher Boye, q. c. g., belt drive. Lathe, wheel, 78"x84" Bement, motor drive. Lathe, spinning 32" belt drive. Lathe, turret, W. F. No. 2A & No. 3A s.p.d. Lathe, turret, 17x6 Le Blond double back gear 18". Locomotive, gas, 6 ton Milwaukee, 36". Miller, plain No. 4 Cincinnati, b. d. Miller, vertical No. 2 Knight, b. d. Miller, vertical No. 6 Becker, motor drive. Mixers, Sprout-Waldren, batch & liquid.

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Pipe machine, 2", 4", 6", 8" Landis-Oster-Williams. Planer, 36x36x10" Cincinnati belt drive. Press, forging, 150 ton United, steam hyd. Press, wheel 180 ton Caldwell, 42", b. d. Press, hydraulic 100-ton Southwark. Presses, O.H. No. 19 Bliss & No. 4 Toledo, 3" str. Press, No. 55 Toledo, bed 20x18". Press, double crank No. 5 Bliss, 2" stroke, b. d. Press, gap, No. 74 Bliss-Consolidated 44" stroke. Press, screw, No. 87 Niagara, hand power. Press, 6 spindle, Waterbury-Farrell. Punch, arc, No. 30 Bliss, roll feed, b. d. Punch, EF Cleveland, 36" throat, 14" thru 1". Pumps, centrifugal 6", 4", 1", motor drive. Riveters, air, hammer, spinning. Rolling mill, cold 9"x18" motor drive. Saws, friction, Nos. 2, 3 & 4 Ryerson motor drive. Saw, cold, 48" Newton motor drive. Shapers, 16", 20", 24" & 36" Gould & Eberhardt. Shears, alligator, 14", 21", 3", 4" & 6". Shear, Angle 6x8x1 Long & Allstatter, m. d. Shear, 30"x16" Niagara, 15" gap, b. d. Shear, 8"x14 ga. Ohl, m. d., 110/220/1/60. Shear, circle, Niagara, 4" cutters, 16 ga. Shear, circle, No. 3 Bliss, 20"x20 gauge. Shear, Guill., No. 5 H. & J., 44" rd., m. d. Shear, 10"x4" Bliss, holddown, b. d. Shear, plate, 80"x1" Pels. Shear, 36" & 42" Niagara, 18 ga. b. d. Shear, rotary 24" throat capacity 4", m. d. 220/3/60. Slitter, gang, No. 2 W-F, 18", belt drive. Slitter, gang, 36" Voder motor drive. Slitter, gang, 36" Braddock, belt drive. Slotters, 6" & 24" Newton. Straightener, 12"x1" Shuster, b. d. Straightener, AS & TP 12"x3/16", belt drive. Straightener, 42" Actna-Standard, 17 roll 28", m. d., 220/3/60. Straightener, 48" Actna-Standard, 17 roll 38", m. d. Straightener, No. 2 K. & R., 14" square, m. d. Straightener, No. 5 K. & R., 24" square belt drive. Thread rollers, W-F No. 7-18" & No. 20-24". Thread roller, No. 201 V. & O., 4", belt drive. Tumbling barrel, 34"x45", belt drive. Upsetters, 1" to 8". Welder, spot 13 k. v. a., Taylor. Welders, arc, 200 & 300 amp. Lincoln.

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WE have purchased the entire stock of the  
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3" stationary \$4.50  
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\$1.00 additional, for swivel vise.  
Above prices are less than wholesale.  
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1-60' x 60' x 6' Pond Planer, two  
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Colburn vert. boring mill, 42", 2 swivel  
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30" x 30" x 10' Gray planer, sgl. hd., m. d.

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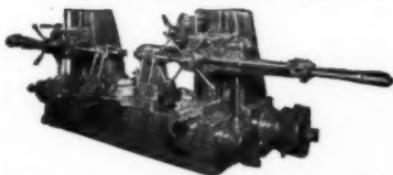


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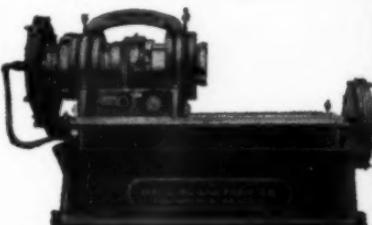
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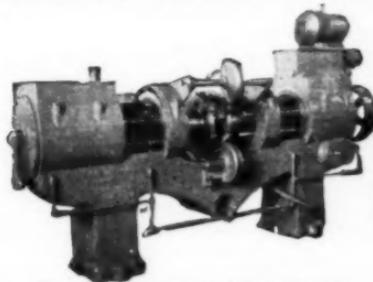
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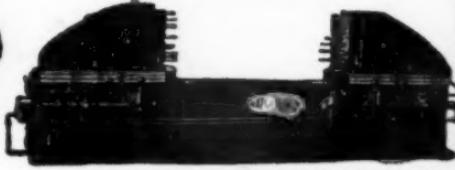
**Cleveland 3-Way Horizontal Boring Mill**



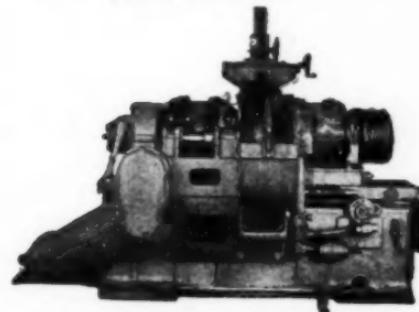
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**LOUIS E. EMERMAN & CO.**  
**1761 ELSTON AVE.,** **CHICAGO, ILLINOIS**

# AS LIQUIDATORS WE OFFER:

1—No. 35 Rochester F.T. Boring Mill, with duplicating attachment.  
 1—42" x 12" Liberty Open Side Planer.  
 1—36" x 36" x 18" Gray Planer, 2 heads.  
 5—Wicks Crankshaft Lathes.  
 7—6 A Potter & Johnson Lathes.  
 5—Potter & Johnson Unimatic Lathes.  
 1—24" American S. P. D. Shaper.  
 1—No. 3 LeBlond Plain Milling Machine.  
 1—27" will swing 30" x 12" LeBlond all geared head Engine Lathe.  
 1—No. 4 W. & S. Univ. G. H. Tur. Lathe.  
 4—No. 11 G. & L. Terom. Int. Grinders, m.d.  
 3—No. 12 G. & L. Terom. Int. Grinders, m.d.  
 1—No. 11 B. & S. Motor Drive Grinder.  
 5—No. 12 Browne & Sharpe Pl. Grinders.  
 2—No. 1 P. & W. 2-sp. deep-hole Driller, motor drive.  
 1—No. 18H Gould & E. Gear Hobber.  
 1—Gould & E. No. 36 S T Gear Rougher.

2—No. 3 Barber-Colman Gear Hobbers.  
 1—Natco No. C-13-H Hyd. Multiple Drill.  
 1—No. 14 Natco Mult. Drill; 12—1 1/4 O. D. spindle.  
 3—No. 310 Baker Drills.  
 1—No. 416 Baker Drill.  
 1—84" Diamond Face Grind, arr. for M. D.  
 1—11" x 14" Ga. O. D. Power Square Shear.  
 1—3 1/4" National Acme 4-spindle Automatic.  
 2—7/8" Model "G" Gridley Automatics.  
 5—Cleveland Automatics.  
 1—3" Model "B" Nat'l Acme 4-sp. Auto.  
 1—Ing. Rand Imp. type No. 10 Air Comp., Size 16x10x14 with 100 H. P. motor, cap. 750 c. f.  
 1—1 1/2" Acme Steel Bed Upset., arr. for M.D.  
 1—3" Acme Steel Bed Upset., arr. for M.D.  
 1—Model "IB" Cleveland S. E. Punch, 36" Throat.

THESE ARE BUT A FEW OF THE MANY ITEMS WE HAVE TO OFFER

**RIVERSIDE MACHINERY DEPOT**  
 255 St. Aubin Avenue.

## DEPENDABLE MOREY VALUES

### BORING MILLS

N. B. P. 6 1/2" bar horiz.  
 Landis 35, 3 1/2" bar, horiz.  
 Cleveland 2 1/2" bar horizontal.  
 Bullard 24", 36" N. E. vertical.  
 Gisholt 42", vertical 2 heads.  
 Colburn 60" vertical 2 heads.  
 N. B. P. 72" Vert. 2 heads.  
 Betts 6—10" ext. type vertical.  
 Bullard 8" Multi-Au-Matic; 6 sp.

### LATHES

Amer 42" x 35" Engine Lathe.  
 Bridgeford 36" x 60" boring.  
 Putnam 36" x 28" g. h., nearly new.  
 Reed Prentice 24" x 18", 24" x 20".  
 Lodge & Shipley 24" x 12" cone.  
 Le Blond 25" x 16" cone.  
 Lodge & Shipley 16" x 6" grd. hd.  
 Hendey 14" to 24" x 6" to 12".  
 200 other lathes—all sizes.

### PLANERS

Cinc. 30" x 30" x 10", 2 hds. P.R.T.  
 Liberty 44" x 42" x 18", 4 heads.  
 Cleve. 46" x 48" x 16", 4 hds. o. s.  
 American 36" x 36" x 20"; 3 heads.  
 W. & P. 60" x 42" x 19" 4 heads.  
 Niles 60" x 60" x 12", 2 heads.  
 Niles 72" x 72" x 14", 2 heads.

### DRILL PRESSES

Natco Nos. 12, 13 & 22 mult. sp.  
 Natco C11 drill, mechanical fds.  
 Natco C13H drill, hyd. feeds.  
 Pratt & W. No. 12 rect. head.

### DRILL PRESSES—RADIAL

Cinc. Bick. 3 1/2", 4", 5" plain.  
 Reed Prentice 3" plain.  
 Baush 6" plain.  
 Western 6", 7" plain.  
 American 6" univ.

### GRINDERS

Pratt & Whitney 14" surface.  
 Head No. 20, No. 22.  
 Head No. 55, 60, 65, 70 inter.  
 Landis 6x18, 10x24, 12x36 pl.  
 Norton 10x36, 14x72 plain.  
 Landis 16x32, 16x48 crankshaft.  
 Norton type B-81, 14x30—36".  
 B. & S. No. 1, No. 3 univ.

### MILLING MACHINES

Lees-Bradner No. 8 Thread.  
 B. & S. No. 2A univ.  
 Brown & S. Nos. 2 & 3 univ.  
 B. & S. Nos. 2B, 3B, plain.  
 Brown & Sharpe No. 5 Vertical.  
 Hanson & Whitney Thread.

Cincinnati 18", 24", 48" auto.  
 long. 24x24x12", 36x36x12", 3 hd.  
 adj. rail.

### AUTO SCREW MACHES.

Brown & Sharpe No. 2 auto.  
 Cleveland 2", 2 1/2" mod. A auto.  
 Gridley 3/4", 7/8", 1 1/4", 1 1/2", 2 1/4".

### GEAR CUTTING EQUIPT.

Barber C. Nos. 3, 12 g. hobbess.  
 Brown & S. No. 13H gr. cut.  
 Gould & E. 18H, 36H.  
 Cleveland 8 spindle spline hob.  
 Gleason 10", 15" spiral bevel.  
 Gleason 24", bevel gear.  
 Fellows No. 8B burnisher.  
 Fellows Nos. 6, 61, 515, 7, 71, 7A.  
 Lees Bradner lapper, cap. 14x8"

### MISCELLANEOUS

Nazel No. 8 Hammer.  
 Sellers 42" wheel lathe.  
 Riehle 50,000 lbs. Testing Mch.  
 Niles 24" Slotter.  
 P. & W. 10" Vertical Shaper.  
 Pels No. 16 com. punch & shear.  
 Pels No. 80 gap shear; 7/8" cap.

**MOREY MACHINERY COMPANY**

410 BROOME STREET.

NEW YORK, NEW YORK

**BORING MILLS,**  
**Horizontal**

- 3" bar Fodick Table Type.
- 4" bar Gisholt, knee, M.D.
- 4½" Univ. No. 44 Tri Way.
- 5" bar Niles Floor type.
- 5" Barrett No. 2 Cyl. Borer.
- 8" bar Beaman Smith Floor

## BORING MILLS, Vertical

7'-10' Betts Ext. Type.  
 72" Pond, AC, MD.  
 60" & 51" Bullards (2).  
 30" Colburn, 1 turret hd.  
 60" & 53" Colburn P.B.T.

## DRILLS, Radio

7' American Univ. Gear Box.  
 6' Amer. Univ. & Plain.  
 6' Mueller, Gear box, M.D.  
 6' & 5' Cincinnati Bickfords.  
 3' American, Sensitive.  
 2, 4 & 6 Spindle Allens.  
 4 Spindle No. 2B Edlund.  
 4 Spindle Kokomo, No. 3 M.T.  
 No. 22<sup>1</sup> Footed Burt.

## GRINDERS

8"x54" Fitchburg Pl. m.d.  
10"x36" Landis Plain (3).  
12"x32" No. 2 Landis Univ.  
12"x36" Landis Plain.  
6"x32" Norton Plain.  
18"x72" Norton Self Cont.  
16"x50" Norton Self Cont.  
No. 6 Bryant Chucking  
18" Bealy No. 26 Disc.  
18" Badger No. 220 Disc.  
24" Gardner No. 4 Disc M.D.  
No. 16 Blanchard, Floor, M.D.  
No. 11 Landis Tool & Cutter  
No. 55, 60 and C8 Heald Cyl  
14" P & W Surface M. D.  
No. 2 B. & S. Surface M. D.  
No. 13 B. & S. universal.  
Heim, Centerless.

## LATHES

14"x6' Cisco t.a., draw-in.  
14"x6' Monarch, q.c.g., cone.  
16"x8' Greaves E., Q.C.G.

## LATHES (Continued)

Hendey Cone, T.A.  
 Prentice, Grd. Hd.  
 ' L & S Cone T.A.  
 ' Am., Q.C.G., Cone  
 Advance, Q.C.G.  
 Lodge & S. Cone  
 LeBlond, Cone  
 Lodge & S. Cone  
 ' Graves K., T.A.  
 Greaves Klausman,  
 ' Lodge & S., cone.  
 Putnam Q.C.G., cone  
 American L. C. G.  
 Pond Grd. Hd., M.D.  
 Boye & Emmes.  
 Bridgeford turning.  
 Boye & Emmes, Cone  
 Fifeild, triple grd.  
 Schumacher Bove,  
 Putnam Grd. Hd.  
 L. & S. Cone, Q.C.G.  
 Fifeild, m.d.  
 Gleason hvy. duty.

## MILLERS

No. 2 Cincinnati Pl., Cone.  
 No. 3 Cinc. Univ., Cone.  
 No. 4 Cin. Hi Power Pl. P.R.T.  
 No. 4G LeBlond S.P.D.  
 No. 2M Cin. Vert., Mir. in B.  
 Nos. 5, 5C, 6 & B Beck. Vert.  
 Model C Becker Vert. S.P.D.  
 Model CS Becker Continuous.  
 No. 2 Cin., Univ. Grd. H. M.D.  
 No. 1½ B B & S. S.P.D.  
 No. 2 B & 8 Univ., Cone.  
 No. 3 LeBlond Univ., Cone.  
 24" x 24" x 12" Ingolers Adj.  
 Rail Planer Type.

## PLANERS

72"x72"x18' D&H Openside.  
 48"x60"x12' Gray, 2 Hds.  
 48"x48"x12' D&H Openside.  
 48"x36"x10' Gray, 2 Hds.  
 36"x36"x8' D. & H. Openside  
 30"x30"x9' Powell, 2 Hds.  
 24"x30"x6' Cinci, 2 Hds.  
 36" Newton Rotary, M.D.  
 30"x30"x10' D. & H. Openside.  
 24"x8' Gray; 24"x7' Niles.  
 24" Lynd Farmar Openside.

## TURRET LATHES

1½" & 2" P. & W's. (2).  
3½" x 36" Cinc'l. Acme Grd. Hd.

## **TURRET LATHES** (Continued)

No. 5 Foster, 1-13/16" bar.  
 24" Gish, 6 1/4" H.S., A.C., M.D.  
 24" Gish, 6 1/4" h.s., 2 cone.  
 28" Gisholt M.D.  
 24" Steinle, 6 1/4" H.S., M.D.  
 24" " 24" & 2 1/2" x 36" J. & L.

#### MISCELLANEOUS

Automatic, 24" Gridley, 1 Sp. Billet Breaking Mach., Ajax. Bolt Threader, 14" Landis. Broach, No. 3B LaPte. M/D. Chucking, Nos. 34 & 23 N. B. Flanger, 1" McCabe Pneu. Gear Cutter, 110" Newton Spur Gear Planer, 24" Gleason. Gear Hobber, 6" Pfauter. Gear Shaper, No. 61 Fellows. Gear Generator, 11" Gleason. Hammer, 2B NazeI M.D. Header, 1<sup>1</sup>/<sub>2</sub>" Acme Rivet. Header, 2" Acme, Steel. Keystras, No. 1 Bak, No. 1 Dar. Keyseat, Nos. 2, 3 & 4 M&M Nibbler, No. 3 Gray 1<sup>1</sup>/<sub>2</sub>" 36". Pipe Mach., 4" Landis, M.D. Pipe Machine, 8" Williams. Pipe Machine, 12" Saunders. Pipe Mach., 12" Curtis & C. Pipe Mach., 2" Bignal Kseler. Press, 400 ton N.B.P. H. Hy. Press, No. 8<sup>1</sup>/<sub>2</sub> Z & H Percussion Press, No. 61 Spec. V & O. Press, No. 74 Bliss Consolidat. Punch & Shear No. 47 PBC B. Punch 54" H & J No. 2 D. Punch, 36" Whit. 7<sup>1</sup>/<sub>2</sub>" x 1<sup>1</sup>/<sub>2</sub>". Rolls, 8<sup>1</sup>/<sub>2</sub>" x 1<sup>1</sup>/<sub>2</sub>" H&J No. 2. Rolls, 14" x 1<sup>1</sup>/<sub>2</sub>" Wickes. Rolls, 20<sup>1</sup>/<sub>2</sub>" x 1<sup>1</sup>/<sub>2</sub>" H & J No. 6. Rolls, Angle, 2<sup>1</sup>/<sub>2</sub>" x 2<sup>1</sup>/<sub>2</sub>" x 1<sup>1</sup>/<sub>2</sub>". Saw, 9<sup>9</sup>/<sub>16</sub>" Peer. Univ. M/D. Saw, 9<sup>9</sup>/<sub>16</sub>" Peer. Hack, M/D. Saw, 6" Arey Milbank. Saw, 6" Gorton No. 2B Inter. Saw, 12<sup>1</sup>/<sub>2</sub>" x 1<sup>1</sup>/<sub>2</sub>" Racine M/D. Shapers, 24", 20" & 16" Cinci. Shaper, 16" American, Cone. Shaper, 24" Gould & Eberhardt Shapers, 24" & 20" Queen.

City M. D.  
Shaper, 16" Ohio, M/D.  
Shaving Mach. P. & W. Vert.  
Shear, 30" Cleveland, No. X.  
Shear, 156"x1" United, 36" g.  
126"x1" Amer., 22" Gap.  
126"x1" Niagara, 18" gap.  
Slotter, 6" Pratt & Whitney.  
Slotter, 15"-18" Dill.  
Slotter, 24" Newton M/D.

## **BENNETT-RAFKIN MACHINE TOOL CO., Inc.**

**Offices: 30 CHURCH ST., NEW YORK CITY**

**AUTOMATICS:** B. & S. No. 2-G; No. 0; No. 00; Cleveland Model A; 1½".

**COMPRESSORS:** 500'; 268'; 156'; 90'; 68'; 42'.

**DRILLS:** Radial; 6' N. B. P. Univ.; 4' Bickford; 4' Cin-B; 2½" - 3' Fosdick; Avey, Sipp, H&W; Allen—High Speed; B. B.; Sens. 1, 2, 3, 4 sp.

**GRINDERS:** Internal No. 70 Heald; 14x50 Norton Pl.; 12x36 Landis Univ.

**TURRET LATHES:** No. 2-A Warner & S.; J & L 3x36 Chucking; J & L 2½x24 bar; Gisholt

21x3½, M.D.; No. 6 Foster Univ.

**PRESSES:** Bliss No. 1 Toggle; Bliss No. 306 Geared; S. S. Tierod; V. & O. No. 5 Geared; No. 2½ Bliss, Grd., O.B.I.; V. & O. No. 2½ No. 1; O.B.I.

**BLISS AUTOMATIC GANG PRESS:** No. 1035; makes 8 operations simultaneously; 180 finished blanks per minute. Roll Feed.

**SPOT WELDERS,** 10 to 90 K. W.

**MOTORS**—All Sizes; large stock.

**KEYSEATER,** Baker No. 3, 72" capacity.

**F A L K M A C H I N E R Y C O M P A N Y**

18 Ward Street, Rochester, New York

## MACHINE TOOLS FOR SALE

**Centerless Grinding Machine,** No. 2 Cincinnati, arranged for motor drive, in perfect condition, equipped for straight through work.

**Universal Milling Machine,** No. 3 Ryerson Conradson high power, single pulley drive, all geared feeds and speeds, complete with universal spiral dividing

head & vertical milling attachment, working surface of table 53" x 12".

**Gear Shapers,** No. 6 Fellows for external and internal spur gears, max. dia of external gears 35", (2).

**Automatic Screw Machines,** No. 0 Brown & Sharpe, hole through largest feeding finger ½", (2).

**LAURENS BROS.**

Peoples Bank Bldg.,

Cincinnati, Ohio

## 15,000 STACKING BOXES



Illustration shows boxes stacked 3 high

Excellent Condition.

24" x 15" x 7½" — 16 gauge.

Drop Handles Both Ends.

Weight 16 lbs.

Olive Green Finish.

**\$1.00 each**

18,000  
Used  
One Piece  
Steel  
Tapered  
Tote Pans

**50¢ ea.**



21x14x5½" — 16 gauge

**PASSMAN BROTHERS**  
705 W. Washington Blvd.,

Chicago, Illinois

**• UNUSUAL TOOLS •**  
**SOLD WITH AN ABSOLUTE GUARANTEE OF SATISFACTION**

**Drills**

3, 4 & 6 Spd. Allen Hi-Speed, Power Feeds, Tapping att., latest type.  
 4 spd. Cincin. Bick., direct motor drive.  
 6-spd. Allen, with power feed to each spdl.  
 5' Carleton, Radical, motor drive.  
 4 spd. Leland G & Allen 12" overhang.  
 No. 1 P&W. 2 spdle. horiz. deep hole, m.d.  
 6 spdle. P&W. Deep Hole, vert., indiv. m.d.  
 Fox, Natco & Bausch Mult. Spdles. m.d. & m.(8).  
 No. 121, 217, 310 and 314 Baker (8).  
 21" & 24" Cin. Bick. (16), direct m.d.  
 3" American Hi Sp. Radical, motor on arm.  
 3 1/2" Morris Radical, single pulley drive.  
 Moline Hole Hog, various sizes (5).

**Gear Equipment**

No. 16 Hi-sp. Gould & E. Gr. Hobber, spd.  
 No. 17 H Gould & Eberhardt Hobber.  
 No. 36 S.T.G.&E. Auto., 4 spdles. Gr. R., m.d.  
**Grinders**  
 Blanch., No. 16 m.d., mtr., 36" mag. chk.  
 No. 125 Gardner, dble. spin. op. m.d. type,  
 Hyd. Feed.  
 No. 11, 12 & 14 B & S Cyl. (8).  
 53" Besley vert. disc. m.d. & M.  
 Nos. 6, 12A & 20 Bryant Int. Chuck (12).  
 12" and 16" x 36" Cinc. Pl. Cyl. (2).  
 Heald Interm. Nos. 60, 70, 72, 75 (8).  
 No. 11 Gid. & L. Tero., hyd., inter., m.d. & m.(4).  
 No. 12 Gid. & L. Ter. hyd., int. m.d. & m.(7).

Cleveland, O.B.I., No. 6-I, grd. m.d., (4).  
 Tol. No. 94 1/2-G, S.S., D.C., bk., grd. B.M. D&Mr.  
 Cleveland, No. HG, O.B.I., gd. motor dr., (3).  
 Canco, No. 5, 8" st., S.S., BK, grd. m.d. & mtr.  
 Cleveland, No. 9 1/2-P, solid back, geared m.d.  
 Toledo, No. 62, s.s., b.k. grd., m.d. & mtr.  
 Toledo No. 24, cam drawing, mtr. drive & mtr.  
 Bliss, No 3A, swinging ad.tbl., m.d. & mtr.  
 Knuckle Joint, 150 Ton Ferracut, G.M.D.  
 100 ton Oilgear Hydraulic, Vertical.  
 10, 25, and 50 ton Henry & Wright with  
 double roll feeds, belt and m.d.  
 No. 5A Toledo, O.B.I. flywheel type.  
 No. 14 Toledo Horning, geared motor dr.  
 No. 4A Bliss Adj. Bed Horning.  
 No. 204A Bliss Adj. Bed Horning, bk. gr., m.d.  
 No. 44 Cleveland, Adj. Bed Horning.  
 P-2, P-3, P-4 Ferracut, solid back, g.m.d. (12).  
 DG-53 Ferracut S.S., S.C., B.G., G.M.D.

**Planers**

24" x 24" x 6" Gray Double Housing, b.m.d.  
 36" x 36" x 14" Lib. Dble. Hsg., 3 hds. m.d.  
 42" x 42" x 12" Liberty Openside, m.d. & m.  
 60" x 60" x 12" Niles Bement Pond, box table.

**Pipe Threaders**

No. 3 Williams m.d. & m., 6" cap.  
 No. 316-A Oster, 6" cap.

**Welders**

Thompson Horiz. Butt, 35 K.W.  
 20-27 KVA Taylor-Winfield Spot (9).

**SPECIALS**

No. 12 P. & H. Boring Mill, floor type, 7" dia. quill, m.d. 5 3/4" dia. spdle. nose.  
 Model "ID" Cleveland Single End Punch, m.d. cap. 2 holes, 1" through 1 1/8"  
 steel, 36" throat, Flanged ram. Latest type.

**Lathes**

American, 20" x 10', Geared Head.  
 Fay Automatics 14" standard (7).  
 Gisholt Simplimatics (2) m.d.  
 16" x 6' Hendey Geared Head, t.a.  
 18" x 8' Hendey, TA, DR & Collets, B.M.D.  
 24" x 12" American Grd. Hd. 28" x 8" 6".  
 31" x 10' Wickes c/s., ecc'tric hds., all m.d. & m.  
 24" x 10' Lodge & S. Crankshaft, m.d. & m.  
 34" x 11' Wickes Crankshaft, m.d. & m.(2).  
 Nos. 5A, 6A, 6C P. & J. Auto. m.d. & m. (12).  
 P. & J. Auto. Unimatic, m.d. & m. (2).

**Mills**

Gid. & L. Bor. No. 56, 6" dia. bar, app. 2 yrs. old, m.d. with hyd. duplc. attach. Cinc., Vert., No. 4, rapid trav., late type. Bor., 48" Bul. Vert. 2 turn. hds., dual control. No. 2 Van Norman, B.M.D.  
 Pratt & Whitney Thread, 8x18".  
 Nos. 1, 2 & 3 Craftsman Rotary Production. 18" Cinc. Semi-Auto single & duplex heads. Hall Planetary Thread, Style D. m.d. & m.

**Presses**

Bliss Consolidated, O.B.I., No. 3, Grd. m.d.  
 Bliss Consol., O.B.I., No. 4, grd. M.D. (2).  
 Bliss Consolidated, O.B.I., No. 5, grd.m.d.

10 KW Federal Spot (3).

100 KW Thompson Projection Spot.

200 KW Federal Projection Spot.

**Miscellaneous**

Polisher, U.S. Electrical Tool, motor dr. in base, 4-bearing, h.d. type (16).  
 Roller, Lev. 54", mtr. d., op. 14 ga. cap. sheets G & E Shaper, 20", high clutch type S.P.D. Tapper, Holmes, No. 3 Tilted, 4-spdl., late type. Auto. Cleveland 2" Model A. (4).  
 11 1/4" Cone Auto, 4 spdles., m.d.  
 Bender, No. 3U Pedrick, M.d.&M., latest type. 2 sp. 3/4" cap. Land Bolt Cut., ld. scr. att. 2 sp. 2" cap. Landis Bolt Cut., ld. scre. att. 18" Gisholt Static Bal., vert. type m.d. & m.  
 2 sp. Coulter Dia. Borer, motor in base.  
 No. 23 Williams & White Bulldozer m.d.  
 Elwell-P Lift Trucks, 3 t. & 6 t. Hi-Lift (2).  
 Wicaco Oil Groover, vert. type.  
 Nos. 2 and 3 P. & W. Profilers, m.d. (3).  
 Berwick Rivet Heaters, (4).  
 Yoder Rolls 5 & 6 spin., 2-2 1/2" dia. shaft.  
 No. 6 H.S. Langeller Swager.  
 National Bent Shank Tappers, 1/2" Cap.  
 20" Sellers Slotter, b.m.d. Reeves Trans.

**AND A COMPLETE STOCK OF FINE UP-TO-DATE EQUIPMENT**

**HARVEY GOLDMAN AND CO.**

10571 GRATIOT AVE. DETROIT, MICH.

# EMCO REBUILT

## BORING MILLS

- 42" King, 1 swivel and 1 turret head on rail, 1 side head, m.d., very late type
- 2-42" King, 2 swivel heads on rail, m.d.
- 42" King, 1 swivel, 1 turret head
- 36" Bullard Spiral Drive, 1 rail, 1 side hd., very late, coolant system, thr. cit.
- 24" Bullard New Era, m.d., 1 rail, 1 s.hd.
- 30" Bullard, cone
- 30" Gisholt, belt, 1 head
- 42" Gisholt, gear box, 2 heads
- 48" Niles Car Wheel Borer, belt

**NEW 73" Niles Boring Mill, m.d. thru gear box, 2 swivel heads on rail, power rapid traverse.**

N.-B.-P. Cyl. Borer, d.c. m. d., has 7" and 12" main bars, 13 port hole boring bars  
 No. 0 Fosdick Horizontal, 3 1/2" bar  
 No 2 Beam. & S. Horiz., 5" bar, H. type, m.d.  
 No. 4 N.-B.-P. Horiz., 5 1/2" bar, table type

## MILLING MACHINES

- No. 2A B. & S. Univ. s.p.d., taper spindle
- No. 2A B. & S. Univ., s.p.d., screw spindle
- No. 1, 2 Cleveland Plain, s.p.d.
- No. 3 Cincinnati Plain, s.p.d.
- No. 4 Kempsnith Plain Maxi Miller, s.p.d.
- No. 2H Brown & Sharpe Plain, cone
- No. 1 1/2, 4, 3 Cincinnati Plain, cone
- No. 2 Van Norman Duplex, belt
- No. 3 Hendey-Norton Plain, cone
- No. 3 Kempsnith Plain, cone
- No. 13B B. & S. Pl., s.p.d., taper spindle
- No. 25 Becker Plain, cone
- No. 22 Garvin Vertical, belt
- 6x48", 6x80" Pratt & Whitney Thread
- 24" Cinc. Pl. Auto., m.d., Nat. Standard
- 24" Cincinnati Duplex Automatic, m.d.
- 48" Cincinnati Plain Auto., m.d., worm drive
- 48" Cincinnati Duplex Auto. m.d., worm drive
- 24" Cincinnati Duplex Automatic, belt
- 48" Oesterlein Tilted Offset, m.d., Timken Bearings, National S. Spindle
- No. 3 Sundstrand Rigidmill, m.d.
- No. 21 Brown & Sharpe Automatic, m.d.
- C66A Newton 3 spindle Continuous, s.p.d.

## GEAR MACHINERY

- 6" Gleas. Str. Bevel, belt, full set segments
- Gleason Gear Burnisher, m.d., cap. 15" grs.
- No. 3 Barber-Colman, belt
- No. 3-26" Brown & Sharpe, belt
- No. 3-36" Brown & Sharpe, belt
- No. 3 Heavy Brown & Sharpe, s.p.d.
- No. 3-26" Cincinnati, belt
- No. 5A Lees-Bradner Hobber, belt, 14" size
- No. 1 Lees-Bradner Hobber, m.d.
- No. 6-60" Brown & Sharpe, m.d.
- No. 6-72" Brown & Sharpe, m.d.

## GEAR MACHINERY—Continued

- No. 12 Barber-Colman, double overarm
- No. 12 Barber-Colman, single overarm
- No. 16HS Gould & E. Type B Hobber, s.p.d.
- 18" Cincinnati Gear Hobber, m.d.
- No. 18HM 2 spindle, G. & E. Hobber, m.d.
- No. 44 Brown & Sharpe Gear Hobber, m.d. Schuch. & S. Gear Tooth Rounder, belt

## SHAPERS

- 10" Alba, gear box, new
- 15" Potter & Johnston Universal, gear box
- 18" Springfield, gear box
- 20" Cincinnati, cone
- 20" Queen City, cone
- 20" Smith & Mills, cone
- 20" Steptoe, cone
- 24" Barker, cone
- 24" Gould & Eberhardt, gear box
- 24" Potter & Johnston Universal, gear box
- 24" Rockford, cone
- 32" Cincinnati, cone

## PRESSES

- No. 496D Toledo Toggle Drawing, weight 124,000 lbs.
- No. 2681/4B Tol. Dbl. Cr. Toggle Draw., wt. 175,000 lbs.
- No. 94 Bliss Consolidated
- No. 93A Tol. Str. Side Dbl. Cr., geared
- No. 92B Toledo Double Crank Geared
- No. 54A Toledo Special, m.d.
- DG53 Ferracutte Redrawing, geared
- S51 Ferracutte Double Crank
- No. 50-4-36 Minster, S.S. D.C.
- No. 35 Toledo Geared Stiles Type
- No. 33 Swaine O.B.I.
- No. 25A Bliss, m.d.
- No. 16 Bliss Horning
- No. 6 Waterbury-Farrel D.C.
- No. 5 Matthews O.B.I.
- No. 5 Bliss Stiles Type
- No. 2 Verdin, Kappes & Verdin O.B.I.
- P2 Ferracutte Stiles Type
- D2, DD2 Ferracutte Drawing

## ENGINE LATHES—GEARED HEAD

- 12"x6" Hendey, taper
- 14"x6" American
- 14"x8" American
- 14"x6" Hendey, taper
- 14"x6" Lodge & Shipley
- 14"x6" Prentice
- 14"x7" Lodge & Shipley
- 14"x7" Prentice
- 14"x8" Hendey, taper
- 18"x8" American
- 18"x10" American
- 18"x8" Prentice
- 18"x8" Sidney, m.d. in leg
- 18"x10" Boys & Emmes
- 18"x10" Prentice
- 18"x12" American

**THE EASTERN MACHINERY CO.**

# MACHINE TOOLS

## ENGINE LATHES—GEARED HEAD—Cont'd.

18" x 14" American  
 18" x 18" American  
 19" x 10" LeBlond  
 20" x 8" Lehmann, 16 speed, taper  
 20" x 8" American  
 20" x 14" American  
 24" x 10" American  
 24" x 10" LeBlond, relieving attach.  
 24" x 10" Prentice

## ENGINE LATHES—CONE HEAD

9" x 3 1/2" South Bend  
 10" x 5" Pratt & Whitney Tool Room  
 14" x 8" Bradford  
 14" x 6" Lodge & Shipley  
 14" x 7" Lodge & Shipley  
 16" x 8" American  
 16" x 6" Cincinnati  
 16" x 6" Cisco  
 16" x 6" Hendey Yoke Head  
 16" x 6" LeBlond  
 16" x 7" Pratt & Whitney  
 16" x 8" Lodge & Shipley  
 16" x 8" Monarch  
 16" x 32" x 8" Putnam Gap  
 16" x 8" Reed  
 16" x 8" Rockford  
 16" x 10" Schumacher-Boyes  
 16" x 10" American  
 16" x 12" American  
 16" x 14" American

## MFG. LATHES

N.-B.-P. Quarter. Mch., m.d., brand new  
 No. 5 N.-B.-P. Center Driv. Car Wheel Lathe,  
 size 42x96", brand new  
 No. 5 N.-B.-P. Car Wheel Lathe, used, m.d.  
 No. 6 9 LeBlond MultiCut, m.d.  
 Niles-Bement-Pond Axle Lathe, cone  
 No. 4 AC LeBl. H.D. Auto. C.S. Lathe, m.d.  
 No. 12 LeBl. H.D. Auto. C.S. Lathe, m.d.  
 3 1/2" x 36" LoSwing, belt  
 8" Sundstrand Stub, m.d.  
 14" x 5" American Geared Head Mfg.  
 14" x 6" LeBlond Rapid Production  
 15" x 6" Automatic Threading  
 16" x 6" American Turret, cone  
 18" x 8" Chard Production, cone  
 20" x 8" American Turret, cone  
 22" x 5" Monarch Grd. Head Mfg., m.d. in base

## PIPE AND BOLT THREADING MACHINES

4" Oster, belt  
 2" Saunders, m.d.  
 4" Eaton, Cole & Burnham, belt  
 2" Merrell, m.d.  
 No. 2 Bignal & Keeler, m.d.  
 No. 4 Bignal & Keeler, belt  
 8" Bignal, belt  
 Type E Amer. Pipe Bend. Mch., m.d., new

**PIPE & BOLT THREAD. MCHS.—Cont'd**  
 American Bolt Header, belt  
 2" Landis Double Head Pipe & Nipple, belt  
 1 1/2" Landis 2 spindle Bolt, m.d.  
 1 1/2" Landis 2 spindle Bolt, m.d.  
 2 1/2" Landis Bolt, m.d.  
 2 spindle 1" Acme Bolt, cone  
 3 spindle 1" Acme Bolt, belt  
 1 1/2" Acme Bolt, belt

## HAMMERS

Pettigell Bumping, belt  
 60 lb. Bradley Rubber Cushioned Helve, belt  
 100 lb. Bates, m.d., new  
 100 lb. Beaudry, belt  
 200 lb. Bradley Upright Strap, belt  
 250 lb. Little Giant, belt  
 350 lb. N.-B.-P. Steam or Air, brand new  
 550 lb. Bement-Miles Steam  
 650 lb. American Steam

## PLANERS

24" Cincinnati Crank, m.d.  
 24" x 24" x 6" Gray, 1 head, belt  
 24" x 24" x 6" Ohio, belt  
 24" x 24" x 6" Smith & Silk, m.d.  
 24" x 24" x 8" Cincinnati, belt, 2 heads  
 28" x 28" x 10" Cincinnati, belt, 1 head  
 30" x 30" x 10" Pond, belt, 1 head  
 30" x 30" x 10" American, belt, 1 head  
 30" x 30" x 10" Cincinnati, belt, 2 heads  
 30" x 30" x 12" Gray, m.d., 2 heads  
 30" x 30" x 12" Gray, m.d., 2 heads  
 32" x 32" x 8" Gray, belt, 1 head  
 36" x 36" x 10" Woodward & Powell, belt, 1 hd.  
 36" x 36" x 12" Fitchburg, m.d., 3 heads  
 36" x 36" x 12" Niles, m.d., 4 heads  
 38" x 39" x 10" Cincinnati Forge, belt, 2 heads  
 48" x 48" x 18" Putnam, belt 4 heads  
 55" x 55" x 30" Bettis, 2 heads, reversing m.d.

## BROACHING MACHINES

Oil Gear Type XB10, Twin Ten Hydraul., m.d.  
 No. 1, 2, 3, J. N. LaPointe, m.d.  
 No. 2, 3 LaPointe Double, belt  
 No. 2, 3 LaPointe, belt

**RADIAL DRILLS**

6" Amer. Triple Purp., m.d. on arm, 17" col.,  
 elec. col. clamp, p.r.t., late, enclos. hd.  
 6" Amer. Triple Purp. m.d. gear box on base,  
 18" column, inc. head  
 3" Amer. Sens. d.c., m. on arm, enclos. head  
 3" Carlton Sensitive, belted m.d.  
 3" Morris Plain, var. speed m.d.  
 3 1/2" Dresses Plain, gear box  
 3 1/2", 4" Morris Plain, gear box  
 4" Hammond Jack Knife, m.d.  
 4" Hammond Jack Knife, wall type  
 5", 6", 7" Amer. Triple Geared, gear box  
 5" Dresses Plain, gear box  
 5" Dresses Plain, gear box, 15" col.  
 7" Fadick Plain, cone  
 No. 1 Barnes Horizontal

**1001 Tennessee Ave., Cincinnati, Ohio**

# SELECT Inland Tools

No. 4 Kempsmith Maximiller Plain Milling Machine, Power Rapid Traverse, S. P. D.

Grinder, No. 2 B. & S. automatic surface. Air compressor, 7 $\frac{1}{2}$  x 6 $\frac{1}{2}$  Worth. dup., m. d. com. Grinder, surf. 12x36 Diam. auto., hyd. fd., m. d. Lathes, 20 $\frac{1}{2}$  x 8 $\frac{1}{2}$  American.; 24 $\frac{1}{2}$  x 12 $\frac{1}{2}$  South Bend. Lathe, eng., 16x6 Amer., grd. hd., m. d. collets. Lathe, 14x8 Hendey, collets, pan bed, ser. 25400. Lathe, 20x12 Cisco, grd. hd., m. d. tap. att. Lathe, eng., 30 $\frac{1}{2}$  x 18 $\frac{1}{2}$  Hou-Stanw-Gamble h.v. d.

Mill & shap. Mach. No. 14 Coch-Bly duplex. Milling machine, No. 2 $\frac{1}{2}$  Rockford plain. Planers, 24 $\frac{1}{2}$  x 24 $\frac{1}{2}$  Ohio, 30x30 $\frac{1}{2}$  x 6 $\frac{1}{2}$  Columbia. Presses, Nos. 2, 3, 4 & 5 Bliss-Consol. o.b.i. pl. Presses, Nos. 5, 6, 8 & 7 o. b. i., Bliss Cons., b. g. Shaper, Hendey 20 $\frac{1}{2}$  " ram, m. d. Shapers, 16 $\frac{1}{2}$  Queen City, 16 $\frac{1}{2}$  Smith & Mills; 16 $\frac{1}{2}$  Kelly; 17 $\frac{1}{2}$  Averbeck, all b. g. Shear, 10 $\frac{1}{2}$  x 14 ga. 6 $\frac{1}{2}$  x 14 ga. D&K pwr. md prac new Rigidmil, No. 3 Sundstrand, motor dr., power rapid traverse.

**Inland Machinery Company**  
41 Se Clinton St. Chicago, Ill.

## — USED MACHINERY FOR QUICK SALE —

### LATHES

No. 2 X. W. & S. Hol. Hex. Turret Lathe, 2 $\frac{1}{4}$  dia. cap. Auto. Chuck & Pwr. Roller Fd., Cross Slide & Counter-4. No. 7 Bardons & Oliver Geared Head Turret Lathe, Air Chuck & Cylinder. Att. for M. D., 42 $\frac{1}{2}$  x 14 $\frac{1}{2}$  New Haven Lathe.

### GRINDERS

No. 1 Wilmart & Norman Tool & Cutter Grinder. No. 12 Brown & Sharpe External Grinders. No. 2 Brown & Sharpe Rotary Ring Grinder. 10 $\frac{1}{2}$  x 72 $\frac{1}{2}$  Type A Norton External Grinder, M. D.

### PLANERS, SHAPERS

36 $\frac{1}{2}$  x 36 $\frac{1}{2}$  x 10 $\frac{1}{2}$  Cleveland Openside Planer, M. D.

**JAMES W. GEORGE 3146 E. Jefferson Avenue, Detroit, Michigan**

200-Ton Niles-Bement-Pond Hydraulic Wheel Press.  
400-Ton Niles-Bement-Pond Hydraulic Wheel Press, All Steel Arr. For Motor.  
42 $\frac{1}{2}$  Gibalt Vertical Boring Mill, 1-Pl. and 1-Turret Hd., With A. C. Motor.  
30 $\frac{1}{2}$  Colburn Vertical Boring Mill, Turret Head on Rail, (old style).  
3 $\frac{1}{2}$ , 4 $\frac{1}{2}$  and 6 $\frac{1}{2}$  Radial Drills.  
5 $\frac{1}{2}$  Niles-Bement-Pond Full Universal Radial, with A. C. Motor.  
No. 2 Cincinnati Universal Cylindrical Grinder.  
No. 2 Cincinnati Plain Cylindrical Grinder.  
7 $\frac{1}{2}$  x 48 $\frac{1}{2}$  x 14 $\frac{1}{2}$  Cincinnati Planer, 2-Heads.  
13 $\frac{1}{2}$  x 16 $\frac{1}{2}$  Peerless Shop Saw, with A. C. Motor.  
8 $\frac{1}{2}$  x 10 Ga. D. & K. Pan and Box Type Brake.  
16 $\frac{1}{2}$  (18 $\frac{1}{2}$ ) x 8 $\frac{1}{2}$  Whitcomb-Blaidsell Geared Head Lathe, (Nearly New).  
3-A Motor Driven High Speed Hammer.  
6 $\frac{1}{2}$  x 6 $\frac{1}{2}$  Peerless Shaping Saw, Arranged For Motor.

**ABOUT 300 OTHER MACHINE TOOLS, COMPRESSORS, ETC. IN STOCK**  
**THE NORTON-BROADWAY MACHINERY CO., 610 Baymiller Street, CINCINNATI, OHIO**

### AUTOMATICS:

B. & S. No. 0 & No. 00.  
B. & S. No. 00 Turret former.  
Clev. Mod A,  $\frac{3}{4}$ "; Mod B, 1 $\frac{1}{2}$ ".  
 $\frac{7}{8}$ " R. 4 Acme Grid. 4 sp., No. 20,000,  $\frac{3}{4}$ " R6.6sp. No. 22,000. Grid. Mod C,  $\frac{3}{4}$ " Mod F, 1 $\frac{1}{4}$ ".

### DRILLS:

Aurora 20 $\frac{1}{2}$  Sliding Hd. H. D.  
1-3 Spindle  $\frac{1}{2}$  inch.  
1-4 Spindle  $\frac{1}{2}$  inch.  
Washburn  $\frac{1}{2}$  " 2 s. p.

### GEAR CUTTER

B. & S. No. 3 Automatic.  
B. & S. Gear Tester.

We Specialize In Rebuilding Automatic Screw Machines, Manufacturers of the Rogaco portable pipe threading machine.

**Triplex Machine Company, 117 Fourth St., Pittsfield, Mass.**

B. & S. Gear Tooth Rounder.

### GRINDERS:

Beals Disc Grinder.  
Landis No. 2 Universal.  
B. & S. Univ. Tool & Cut.  
10 $\frac{1}{2}$  x 36 $\frac{1}{2}$  Norton cyl. c. & d. (3).  
Norton Pl., 6 $\frac{1}{2}$  x 32 $\frac{1}{2}$  (2).  
W & M dbl. end drill grinder.  
Head Internal No. 55.

### LATHES:

Hendey Yoke hd., 14 $\frac{1}{2}$  x 6 $\frac{1}{2}$  Ser. No. 20,000, tap. att., C. D.  
Rockford 14 $\frac{1}{2}$  x 6 $\frac{1}{2}$  Eng. Q.C.G.,  
3 Step C. D.  
LeBlond b. d., 18 $\frac{1}{2}$  x 12 $\frac{1}{2}$ , c. d.

### MILLERS:

Cinc. No. 2 Universal, all att.  
Garvin No. 2A Univ., all att.

### PIPE THREADERS

Rogaco Portable 2 $\frac{1}{2}$  (2).

Oster 4 $\frac{1}{2}$  B. D.; Apex 6 $\frac{1}{2}$  B. D.

### PLANERS:

Powell 30 $\frac{1}{2}$  x 30 $\frac{1}{2}$  x 8 $\frac{1}{2}$ , 2 H. D.

### SHAPERS:

Potter & Johnson 15 $\frac{1}{2}$  Sw. T. Sim. 16 $\frac{1}{2}$  tilting table, vise.

Stockbridge 20 $\frac{1}{2}$  crank, vise.

### TURRET LATHES:

J. & L. 2 $\frac{1}{2}$  " x 24 $\frac{1}{2}$ .  
W & S 1 $\frac{1}{2}$  " , P & W 6 $\frac{1}{2}$  " (2).

# BUY WITH CONFIDENCE

## BORING MACHINES

No. 1 Cleveland, 2½" bar.  
 No. 1 Blomquist-Eck, 3½" bar, s.p.d.  
 No. 31 Lucas, 3" bar, motor drive.  
 No. 2 Coffman, 3½" bar, motor drive.  
 No. 2 Barrett, 5" bar, extension bed.  
 5" Bar Niles-Bement-Pond, Fl. Type.

## BORING MILLS

24" Bullard, "New Era."  
 30", 36" King.  
 42" Gisholt, motor drive.  
 42" King, motor drive.  
 48", 54", 60" Colburn.  
 52" King, motor drive.  
 60" Gisholt, motor drive.  
 72" King, motor drive.  
 72" Niles, Bement, Pond.  
 10" Niles.

## DRILLS

No. 2 Colburn, 3, 4 Spindle.  
 No. 12 Colburn, 1 Spindle.  
 No. 314 Baker Heavy Duty.  
 No. D-4 Colburn Heavy Duty.  
 No. 1, No. 3, No. 4 Baush Multiple.  
 3" American triple purpose, late type.  
 3" Western Plain Radical.  
 4" Carlton plain.  
 4" American triple purpose.  
 4" American triple purpose.  
 6" Western Plain Radical.  
 7", 8" Western heavy Radical.

## GRINDERS

8"x18", 36" Cinn., Plain, Saddle Type.  
 20"x168" Landis Pl., Motor Drive.  
 26"x96" Landis.  
 No. 2, 2½ Universal (Bath type).  
 No. 4 Landis Universal.  
 No. 70 Heald Internal.  
 No. 22-12" Heald rotary surface.  
 No. 16-26" Blanchard vert. surface.  
 No. 16-A Blanchard Auto. Vert. Surface.

## LATHES

14"x6" Lodge & Shipley Sel. Grd. Hd.  
 16"x6", 8" Lodge & Shipley.  
 16"x7" Lehmann grd. hd., taper. att.  
 16"x10" Am. grd. hd., relieving att.  
 18"x8" L&S. Grd. Hd., taper att.  
 20"x10" Lodge & Shipley Grd. Hd.  
 19"-38"x10" Le Blond Sliding Bed Gap.  
 22"x12" L&S. Grd. Hd. taper att.  
 24"x12"; 14"; 16" L&S., grd. hd.  
 24"x14", 16" American, Geared Head.  
 27"x12" American Geared Head.  
 30"x11", 15" American, Geared Head.  
 30"x12" Lodge & Shipley, taper att.  
 36"x20" Le Blond hvy. geared head.  
 36"x24" Bradford, taper att.  
 46"x30" Houston, Stanwood & Gamble, m d

## NORTON MOTOR DRIVEN GRINDERS

6"x32"	10"x72"	14"x96"
10"x18"	10"-15"gapx72"	16"x50"
10"x24"	10"x96"	16"x72"
10"-15"gapx24"	14"x36"	18"x96"
10"x36"	14"x50"	18"-24"gapx96"
10"x50"	14"x72"	21"x96"
23"x120"		20"x144"

## MILLERS

No. 1-B, No. 2-B, No. 3-B Milwaukee, pl.  
 No. 2, No. 3, No. 4 Cincinnati Plain.  
 No. 4-B Brown & Sharpe, plain.  
 No. 1-B Milwaukee Universal.  
 No. 2 Brown & Sharpe Universal.  
 No. 3 Cincinnati Universal.  
 No. 2 Cincinnati vertical, m.d.  
 No. 3-B Milwaukee Vertical.  
 No. 5-B, No. 6, No. C-2 Becker Vertical.  
 6"x14" 6"x48" Pratt & Whitney Thread.  
 No. 4, No. 12 Lees-Bradner Thread.  
 No. 5-48" Cincinnati Hydromatic.  
 18" & 24" Cincinnati Auto. Duplex.  
 24"x24"x12" Ingersoll, adjustable rail.  
 36"x36"x12" Newton Duplex.

## PLANERS

24"x24"x12" Gray.  
 30"x30"x14" Gray, reversing motor dr.  
 36"x36"x10" Gorton.  
 36"x36"x28", 18" Cincinnati.  
 36"x36"x14"-24" Cleveland Open Side.  
 42"x42"x30" Niles-Bement-Pond, Rev. M.D.  
 44"x36"x12" Gray.  
 48"x48"x16" Niles-Bement-Pond.  
 72"x48"x10" Cincinnati.  
 72"x60"x16" American Widened Pattern.

## PRESSES

No. 01, No. 1 V&O., O.B.I., M.D.  
 No. 1½ V&O., O.B.I., M.D.  
 No. 20 Bliss, O.B.I., M.D.  
 No. CG-24 Ferracute O.B.I., Geared, M.D.  
 No. 3; No. 5 V&O., O.B.I., grd., M.D.

## SHAPERS

20" Smith & Mills.  
 24" Gould & Eberhardt.  
 32" American, Extra Heavy, Late Type.

## TURRET LATHES

No. 5 Foster Univ., Timken Bearing.  
 No. 1-B Foster Universal.  
 No. 1-A Warner & Swasey, Motor Drive.  
 No. 2-A W. & S. A. C. & B. F.  
 No. 2-B Foster Univ., Timken Bearing.  
 No. 3A Warner & Swasey, 4¾" H.S.  
 No. 3-B Foster Universal.  
 No. 4-L Gisholt, cross sliding turret.

**HILL-CLARKE MACHINERY CO.**  
 645 W. WASHINGTON BOULEVARD, CHICAGO

## VERTICAL BORING MILLS

16' Bette; 2 swivel heads; M. D.  
60' Gisholt; 2 swivel hds.; Power  
Rapid Traverse, M. D.  
54' Bullard New Era Type Vert.  
Turret Lathe; Motor Drive.  
53' N.-B.-B.; 2 swivel hds.; Power  
Rapid Traverse; Motor Drive.  
44' N.-B.-P.; 2 swivel hds., Pwr.  
Rapid Traverse, Motor Drive.  
48' Colburn; 2 swivel hds., S.P.D.  
42' Bullard; 2 swivel heads; Pwr.  
Rapid Traverse; S. P. D.

## HORIZONTAL BORING MILL

4½" bar Niles-Bement-Pond Duplex  
Control Table Type; M. D.

## MILLING MACHINES

No. 2-B Milwaukee Univ.; M. D.  
No. 2 Cincinnati Univ.; Bell Dr.  
No. 33 B. & S. Auto.; Mtr. in Base.

## LATHES

30" x 17' Houst., Stan. & G.; B. D.  
26" - 48" x 28" McC. Dbl. Sp. B. D.

14" x 6' American Grd. Hd.; M. D.  
14" x 6' Hendey Grd. Hd., Taper,  
Motor Drive.

## GRINDERS

No. 16 Blanchard Direct Mtr. Dr.  
Vert. Surf.; 26" mag. chuck.  
No. 33 Abrasive Surf.; Mtr. in Base  
No. 3 Abrasive Surf.; Mtr. in Base.  
10" x 72" Norton Plain.  
No. 24 Gard. Hor. Disc; 53" dia.  
No. 14 Gardner Disc; 20" dia.  
No. 8 Badger Ball-Bearing Disc.

## TURRET LATHES

No. 3A Warner & S. Univ.; M. D.  
3" x 36" Jones & L.; S. P. D.

**AUTOMATIC SCREW MCHS.**  
9/16" Acme 5-Spd. Model "C";  
Slot, Attach.; Motor Drive.  
1½" Cone 4-Spindle; Motor Dr.  
1½" x 1½" Cleveland Model "A".

RADIAL DRILLS AND  
DRILL PRESSES

7' Cincinnati Bickford; M. D.  
7' American Full Univ.; M. D.

4' & 5' Cincinnati Bickford; M. D.  
3' & 4' American; M. D.  
24" Cincinnati Bickford; S. P. D.  
No. 2 Avey 4-Spindle; M. D.

## MISCELLANEOUS

**GEAR HOBBER**, No. 12 Barber  
Colman.

**HAMMER**, 300-lb. Bradley Helve.

**PLATE PLANER**, 18' Hilles &  
Jones; ¾" cap.

**KEYSEATER**, No. 2 Baker; M. D.

**PRESS**, No. C-4; Inclinable Ferracut

**HYDRAULIC RIVETER**, 150-ton  
Chambersburg; 6" stroke.

**ROLLS**, Wickes; vertical type; cap.  
12" x 1½"; largest roll 23" dia.;  
2 smaller rolls 17" dia.

**SHAPER**, 24" G. & E.; M. D.

**SLOTTER**, 24" Newton; 42" rotary  
table; M. D.

**SHEAR**, Hilles & Jones Threadless.

## SUN MACHINERY COMPANY, INC.

36 VAN VECHTEN STREET,

NEWARK, N. J.

## 3000 MACHINES IN OUR WAREHOUSES

## BORING MILLS

Bullard 24" New Era, M. D.  
Niles 42" Two Head.  
B., 36", 42" 2 hds. on rail.  
Bullard 70" vertical.  
Giddings & Lewis No. 32 hor.  
Rockford No. 2, 2" bar.  
Barrett No. 2 cyl., 5" bar.

## DRILLS

P. & W. No. 1 Gun Barrel.  
P. & W. Nos. 11, 12, 13 Mult.  
Cin-Bick, 3½" Radial.  
Fostick 4" Radial, M. D.  
N.-B.-P. 6" Radial, Univ.; Reed.  
Prentice 6" Radial.  
Upright Drills—All makes & sizes.  
Allen 3, 4, & 6 sp. B. B.  
Detroit No. 2, 5 Spd. Hor.

## GRINDERS

Blanchard No. 16.  
B. & S. Nos. 1, 2, 3, Univ.  
Bryant Nos. 6, 10A, 18A, S. A.  
2 Sp. Hole, No. 40 Chuck.  
Disc Grind.—All makes & sizes.  
Heald No. 70, 85 Internal.  
Heald No. 72A3 Gagematic Internal, M. D.  
Norton 10" x 18" M. D. Plunge Cut.  
Heim Centerless.  
Rivett No. 6, 103 Internal.  
Nort., 6x32", 10x36", 10x50",  
10x72", 14x30" Pl. Cyl.

## LATHES

Hendey Lathes—most sizes.  
Monarch 16" x 10" G. H. Ball  
Bearing.  
American 20" x 38" g. h.  
New Haven 24" x 10", 24" x 12",  
24" x 20".  
Pittsburgh 32" x 24", g. c. g.  
American 36" x 17" G. H.  
W. & S. Nos. 1A, 2A, 3A Tur.  
W-F No. 3 Chucking.

## MILLERS

Kempsmith No. 3 Universal.  
Becker No. 6 AB V.  
No. 2 Vertical, 8. P. D.  
Van Norman No. 1, 2, 3, Dupl.  
Lincoln Millers of all kinds.

P. & W. 6x14"; 6x48", 6x80"  
Thread millers.

Milw. & Garvin Cam Millers.

## PRESSES

Bliss No. 18, 19 & 20 O. B. I.  
V. & O. No. 12, 14 D. A. C. In.  
Zeh & Hah, 8½" C Percus.  
Bliss No. 21, 100 ton K. J.  
W-F 200 ton Knuckle Joint  
Wat. No. 6 D. A. Pillar Cam.  
Ferracut No. 105 D. A.  
Ferr. D. G. 53 S. S. Draw.  
Terkelsen D-1 150 t. m. Spring.  
Stand. No. 4-R S. S. Reducing.  
W-F Long. Stroke for shells.  
W-F No. 3 Blanking.  
Ferracut No. PG-P4.

Henry & Wright 25 & 50 ton  
Dieing Machines.

Bliss No. 16, 4" str., Overh.

**SCREW MACHINES**

Grid. 9/16", 2½", 11" Mod. G.  
Clev. ½", 2½", 4½", 5½", 7½", 2½",  
2½", 2½", 4½" Auto.

B. & S. Auto.—most sizes (we  
are specialists).

New Brit. 1x5", 1½" x 7" A.  
Cone 1½" Automatic.

Hand Screw M. of all makes &  
sizes; W. & S. Foster, B. & S.  
Jones & L. S. H. D. T. L.,  
2½" x 24", 3x36".

Potter & Johnston Nos. 5A, 6A

Chucks.

## MISCELLANEOUS

Broaches, LaPointe 1-2-3-4.  
Burnishing Barrels, Abbott.

Hammer-Board Drop, must be  
moved.

Headers, many sizes & makes.  
Lapper-Norton 15C.

Mounting Machines, P. & W.  
12", 24", & 48".

Rolling Mill, Robertson 12" x 12"  
for non-ferrous metal.

Shapers—from 7" to 32".

Slitter, Bradock 36" M. D.

Tapper—Threadnut No. 2  
auto. nut.

Wire Formers, Nilson & Baird.

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37-127 WATER ST.,

1-1

NEW HAVEN, CONN.

# MILES' QUALITY TOOLS

## BORING MILLS

- 3" Bissell knee type.
- 3 1/2", No. 3 1/2 Universal.
- 3 1/2", No. 5A Defiance.
- 4" D. & H. floor type.
- 24" Bullard with side head.
- 34" Colburn single turret.
- 36" Niles car wheel.
- 42" King.
- 42" Detrich & Harvey.
- 51" Bullard.
- 60" Gisholt.
- 84" King. Practically new.

## DRILLS

- 21", 24" & 28" Cincinnati.
- 24" Barnes all geared.
- 21", 24", 28" Superior.
- 24" Aurora.
- 30" Snyder.
- No. 121, 217, 314, 315, 321 Baker.
- No. 2 Mfg. Colburn 1, 2, 3, 4 spdl.
- Nateco multiple. Nos. 11, 12, C12, 13, C13, 14, B14 & 30.
- No. 1 Baush multiple.
- No. 1 Pratt & Whitney gun.
- 6 spdl. Pratt & Whitney deep hole.
- Nos. 6D, 11D & 16D Moline.
- No. 10D Moline cylinder borer.
- 5 spdl. Detroit automatic.
- Nos. 15 1/2 & 17 Foote Burt.
- 2 1/2" Morris radial.
- 3" Dresses radial.
- 3 1/2", 4", 5" and 6" Western radial.
- 4" Mueller radial.
- 4" Hammond radial.
- 5" American triple purpose radial.
- 6" N.B.P. univ. radial.
- Sensitive; All makes and sizes.

## FORGING TOOLS

- Nos. 3, 25, 8 & 9 Williams & White bulldozers.
- Nos. 3B & 51 Nzel hammers.
- No. 1A Ajax forge rolls.
- 1", 1 1/2", 2" & 4" Ajax up-setters.
- 1 1/2" Acme up-setter.
- 1" No. 3 W. F. cold header.
- No. 60 W. F. thread roller.

## GEAR CUTTERS

- Nos. 7, 7A, 75, 75A, 77A and 6 Fellows shapers.
- No. 12 Barber Colman.
- Nos. 12HS, 18H & 36H Gould & Eberhardt hobs.
- Nos. 1 Mfg. & 5A Lees Bradner.
- 28" G. & E. spur. & bevel.
- 36" x 10" Newark automatic.
- 48", No. 4 B&S. automatic.
- Gleason quenching press.
- Fellows hourglass generator.

- Nos. 2 & 2 1/2 Bilton auto.
- Gleason bevel tester.
- Ingle tooth rounder.
- G & E cutter grinder.
- Fellows cutter & gear checker.
- National Cleveland cutter & gear checker.
- No. 10 B Lees Bradner gear grinder.

## THREE 10" PRATT & WHITNEY HYDRAULIC GEAR GRINDERS

## GRINDERS

- No. 2 Cincinnati centerless.
- Heald Internal, Nos. 70, 72A3 Sizematic & Gagematic.
- No. 6 Bryant internal.
- 26", 30" & 36" Blanchard Surf.
- 8" & 12" Arter rotary surf.
- 6" x 36" Norton surface
- 7" x 45" Bath surface.
- 8" x 36" Manhattan surface.
- 14" Pratt & Whitney BB surface.
- 8" x 48" Norton Abrasive surf.
- 16" x 48" Diamond surface.
- 20" x 50" Safety Emery surf.
- 30" x 84" Diamond face.
- 18", 24" & 30" Gardner disc.
- Nos. 8 & 221 Badger disc.
- 24", No. 84 Gardner opp. disc.
- Norton: -10" x 18" to 14" x 72".
- Landis: -10" x 24" to 16" x 72".
- Modern: -12" x 24".
- Cin.: -12" x 36" & 12" x 48" univ.
- No. 4 Brown & Sharpe univ.
- No. 21 Bath universal.
- 8" Arter auto piston ring.
- No. 184 Greenfield cutter.
- Woods tool and cutter.
- National Tool worm.
- Pratt & Whitney worm.
- No. 521 Mumford Diamond Swing.
- Ghosh tool grinder.
- 14" Ingersoll tub.
- No. 20 Bath spline.
- 16" x 10" Bath spline.

## ENGINE LATHES

- 16" x 5" Pratt & Whitney.
- 12" x 6" Monarch.
- 13" x 6" Willard.
- 14" x 6" Monarch.
- 16" x 6" Monarch.
- 16" x 10" Lodge & Shipley Grd. hd.
- 16" x 10" Leblond.
- 18" x 10" Morris geared head.
- 20" x 8" Monarch.
- 20" x 10" Reed Prentice grd. hd.
- 20" x 12" Morris grd. hd.
- 21" x 18" Leblond.
- 21" x 10" Davis.
- 22" x 10" Rahn Larmon.
- 22" x 12" Hendey.
- 24" x 12" Lodge & Shipley grd. hd.
- 24" x 14" Reed American grd. hd.
- 24" x 14" Rose & Emes grd. hd.
- 26" x 14" Leblond grd. hd.
- 26" x 11" Wickes.
- 26" x 12" Hendey.

## LATHES, TURRET

- Nos. 1A, 2A, 3A, 2 & 6 W. & S.
- Nos. 2, 2A, 3A & 6 W. & S.
- Nos. 3 & 4 Foster.
- 18" Libby.
- 21" Gisholt.
- 1 1/2", 3 1/2" Cincinnati Acme.
- 24" Bullard vertical.

## MILLERS

- Nos. 3 & 4 Cincinnati.
- No. 2 Hy. & 3B B. & Sharpe.
- No. 4 Hendey.
- No. 4 LeBlond.
- No. 2 1/2 Rockford.
- No. 3 Kempton.
- No. 4 LeBlond.
- No. 2 B. & S. universal.
- No. 3 Cincinnati universal.
- No. 35 Ohio universal.
- No. 3-24 Cincinnati Hydro-matic.
- 24" & 48" Cincinnati duplex.
- 18", 24" & 48" Cincinnati, auto.
- 48" Ohio tilted offset.
- 44" x 12" Pratt & Whitney thread.
- Nos. 13B & 33 B. & S. Mfg.
- Nos. 2 & 2 Kent Owens hand.
- No. 3PV Kent Owens power feed.
- 66" x 36" x 10" Ingersoll adj. rail.
- 36" & 42" Ingersoll rotary.
- 36" Newell rotary.
- Davis & Thompson drum.
- Model C Becker vertical.
- No. 3 Sundstrand Rigidimil.
- 28" 37" & 42" Briggs.
- Taylor & Fenn spline.

## PLANERS

- 24" x 24" x 6" Cincinnati crank.
- 24" x 24" x 6" Gray.
- 32" x 32" x 6" Niles.
- 36" x 36" x 10" Cincinnati.
- 36" x 36" x 16" Cleveland openside.
- 42" x 30" x 10" Liberty openside.
- 48" x 36" x 10" Liberty openside.
- 48" x 48" x 12" Woodward & Powell.
- 56" x 56" x 16" Gray.

## SHAPERS

- 7" Rhodes.
- 10" McMahon.
- 15" Potter & Johnston.
- 16" Ohio.
- 16" Kelly.
- 16" Walcott.
- 16" Stoen.
- 16" Gould & Eberhardt.
- 20" Hendey.
- 24" Gould & Eberhardt.
- 24" Potter & Johnston.
- 24" Walcott.
- 24" Cincinnati shaper planer.
- 25" Cincinnati.

2100 TOOLS IN STOCK. SEND FOR LIST.

**MILES MACHINERY CO.**  
SAGINAW, MICHIGAN

## LATHES—ENGINE, TOOL ROOM and MFG.

12x6 Hendey grd. hd., taper, m. d.  
 14x6 LeBlond, double back grd., b. d.  
 14x6 Hendey, taper, belt drive.  
 14x6 Hendey, draw-in, motor drive.  
 14x8 Hendey, taper, draw-in, d. b.  
 14x8 Am. Timken Spdl., motor in base.  
 14x10 American, taper, belt drive.  
 16x6 Hendey, taper, belt drive.  
 16x8 Prentice, taper, motor drive.  
 16x8 American, taper, belt drive.  
 16x8 Hendey, taper reliev. attach., b. d.  
 16x8 Hendey, g. h. tap., draw-in, m. d.  
 18x12 L. & S. patent hd., taper attach.  
 18x8 LeBlond double back grd., b. d.  
 20x8 Prentice Bros., geared head.  
 20x10 L. & S. patent hd., with tap. att.  
 24x10 S. & B. q. c. taper attach., b. d.  
 24x12 S. & B. q. c., belt drive.  
 27x10 American grd. hd., motor drive.  
 27x10 Amer. grd. hd., taper att., m. d.  
 27x12 American grd. hd., m. d.  
 27x16 Amer. grd. hd., taper att., m. d.  
 32x12 L. & S. q. c., belt drive.  
 30x16 Johnson triple geared, b. d.  
 30x18 Amer. grd. hd., taper, m. d.  
 30x20 American grd. hd., m. d.  
 32x14 L. & S. q. c., belt drive.  
 32x28 Bullard triple geared, m. d.  
 36x18 S. & B. quick change, b. d.  
 9x14 Porter-Cable Mfg.  
 9x20 Porter-Cable Mfg.  
 16" swing Sundstrand Stub, with facing.  
 11" LeBlond hvy. duty Automobile, m. d.  
 8x16" Lo-Sw., 2-carr., hard. way, m. d.

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SPACE DOES NOT PERMIT OUR LISTING AVAILABLE MACHINES HERE. SEND US YOUR INQUIRY AND WE WILL QUOTE IMMEDIATELY.

*OVER 2000 MACHINE TOOLS IN STOCK—GET OUR LIST.*

## SIMMONS MACHINE TOOL CORP.

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Singer Bldg.,  
 New York City

# Good Used Machinery

**ARC WELDER**—Wilson 300 amp., 15 h.p. motor; portable; UNA 300 amp., 10 h.p. motor.

**BORING MILLS**—Niles 36" c. d. Baush 44" m. d. N-B-P 54" s. p. d. Vert. with 2 heads; Barrett 5" bar. c. d. horizontal; Bullard 51" Vertical 2 heads; Rock. No. 2 horiz. Colburn 42" vert.

**BRAKES**—D. & K. 5' Box & Pan, 14 ga.

**DRILLS (RADIAL)**—Mueller 2½", Fosdick 2½", Prent. 3'; Carlton 4' all gear box dr.; Hammond 4' sensitive; Amer. 2½" M.D. gear box. Mueller 4½" g.box.

**DRILLS (H. S. B. B.)**—H & W 2, 4, 5sp.; Allen 2 & 6-sp.; Avey, Demco, Lel-Gift. 1-sp.; Avey 2-sp.

**DRILLS (MISC.)**—Baker No. 217 (2) & No. 314 Hvy. Duty; Hamilton 42" S.H.; Barnes 20" & 24" 1-sp. & 20" 4-sp. & 24" 3-sp. all grd. camel back; P & W No. 12 Multi-Sp.; Nato 20-sp. Rect. head.

**GEAR CUTTERS**—G & E 60" & B & S 26" s. p. d. automatic spur; Fellows 24" gear shaper. Cincinnati 36" gear cutter.

**GRINDERS**—P & W 12" vert. surf.; Cin. No. 1½ & B & S No. 12 univ. tool, B & S Nos. 11 & 16 plain, Heald Nos. 60 & 65 Int.; B & S No. 13 Univ. & Tool; Landis 10x30" Plain; B & S 10x48"; 3—Norton 6x32" plain, Heald No. 20 Rotary Surface (3); B & S No. 2 Univ.; Badger No. 220, auto. d. e., opposed disc (4); Walker 8" Rot. Surf.; Modern No. 6 Int. Brown & Sharpe No. 2 Surface.

**KEYSEATERS**—Mitts & Merrill No. 5 vert. Davis No. 1 and No. 2, & Catlin No. 2.

**LATHES**—Monarch 16"x10" M.D.; LeBlond 18"x8"; Lehmann 18"x9"; Amer. 22x8"; Davis 22"x10"; L & S 20"x10"; S-B & E 20"x10" q. c. q.; Flather 22"x10"; Bradford 21"x10"; LeBlond 16"x8"; P & W 17"x10"; Gleason 45"x12"; Johnson 36"x24"; Monarch 16"x8" (2); Hendey 14"x6" & 16"x8".

**MILLING MACHINES**—Ohio No. 29 Univ.; Kemp. No. 3; Brown & Sharpe No. 3; Cleveland No. 1 single pulley dr., univ.;

Amer. No. 1½; Cin. No. 3; B & S No. 3; Hendey No. 3; LeBlond No. 3; Mil. No. 3-B & Cinc. No. 3 s. p. d. pl.; Becker Model "B" & No. 6 vert.; Kemp. No. 33 spd. Prod.; Ingersoll slab, M.D. 33", table 30½"x16"; LeBlond No. 4 m. d. pl. Cin., No. 1½ Univ. M.D.; Cin. No. 4 pl. High Power; Cin. 12" Mtg. & 24" Auto. Clev. No. 2 S.P.D., Pl. B.&S. No. 0 Pl.

**PLANERS**—Gray 30"x30"x10" 2 heads; Gray 48"x48"x10"; Gray 28"x28"x6" 1-hd.; Pond 32"x34"x10"; Hamilton 60"x36"x10", 2 heads.

**PUNCH PRESSES**—Toledo No. 3, o.b.i.; Federal Nos. 1, 2, 3 o.b.i.; Bliss No. 62 geared; Ferracute No. P-4; Toledo No. 52 arch; Fer. No. EGF 52 Coining; Willard No. 4A o.b.i.; Swaine No. 38 arch, geared; Swaine No. 37 o.b.i.; Bliss No. 83 Reducing; Niagara No. 4½ Rock, Nos. 2 & 3; & Verson No. 4 o.b.i.

**SAWS (HACK)**—Racine 6x6" H. S.; Peerless 6x6" H. S. (4); Peerless 6x6" M. D. Univ. Shaping (2).

**SHAPERS**—S & M, G & E, Ohio, Mi., Q. City, Davis, Cin. 16"; Ohio & G & E 20"; S & M, Q. City, Rock 24"; Ohio 26"; Cin. 24" s. p. gr. box; Rhodes 3½" Vertical; American 24" heavy; b.g. Amer. 15"; Springf. 15"; S&M. 26", b.g.

**SCREW MACHINES**—W & S No. 4 & No. 6 Hand; Nat. Acme. Nos. 515, 52, 55, & 56 4-sp.; Gridley 4-sp. 7"; Automatic, B.&S. No. 00 auto.

**SLOTTER**—Bement-Miles 10" vert.

**SQUARE SHEARS**—D & K 52" 14 GA. Power; Tol. 72", 14 ga.; Stoll 42", 14 ga.

**TAPPING MACHINES**—(2) Garvin No. 2 & 2X Vertical Automatic & Garvin No. 1.

**THREAD MILLERS**—Moline No. 10; Lees-Bradner No. 3 (2).

**TURRET LATHES**—Bullard 36" vertical, rapid production. Bausch 30" M.D.; Bullard 24" vert., rap. production.

*Above is only a small part of our large stock on hand*

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**MACHINERY CO.**  
1531-35 N. Broadway ST. LOUIS, MO.

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### 36" BULLARD "New Era" Boring Mill.

#### GRINDERS—

- 3—No. 11 BROWN & SHARPE Plain, S. P. D.
- 6—No. 10 BROWN & SHARPE Plain, S. P. D.
- No. 22 HEALD Rotary
- 2—No. 3 VAN NORMAN Internal.

#### SCREW MACHINES—

- 4½" GRIDLEY, Model L, Single Spindle, M. Drive.
- 2-1½" x 7" NEW BRITAIN, 6-sp. Automatic.
- 2—No. 1 BROWN & SHARPE HAND SCREW, M. Dr.
- 3—No. 5A POTTER & JOHNSTON CHUCKING.

#### MILLERS—

- 4—No. 0Y BROWN & SHARPE, Plain.
- 1—No. 1Y BROWN & SHARPE, Plain.
- 6—No. 6 WHITNEY Hand Millers.

#### DRILLS—

- 4—No. 2 AVEY, 2-spindle, Late Type.
- 2—No. 2B EDLUND, Power Feeds.

#### SPECIALS—

- 3—No. 1 WESTERN (GARVIN) 2-sp. TAPPERS.
- ½" Cap. W. F. FDRY. HEADER—D. S. S. D.

## Daley & Sibley

### MACHINERY DEALERS INCORPORATED

411 CHAPEL ST.

NEW HAVEN, CONN.

**Libby Turret Lathe, 7½" hole in spdl., Hardened Ways, M. D.  
1B Foster Universal Turret Lathe, S. P. D.**

#### Automatics

Nos. 80G, 90G Brown & Sharpe,  
2" Cleveland, Model C.

1" & 2" Cleveland Model A & B.

#### Band Saws, Metal

No. 8 Marvel motor drive, (2).

#### Drill Presses

4 sp. Barnes Camel Back self oiling.  
20" to 28" Barnes and Milwaukee.

No. 2 Avey, arr. M. D., 12" over-hg.

1 & 2 spindle, Alien, M. D., B. B.

4 spindle Aveymatic.

4 spindle Leland-Gifford, p. f.

6 spindle Kems B., B., M. D. tapping attach, on each spindle.

#### Gear Hobbers

No. 12 H Gould & Eberhardt.  
Nos. 3 & 12 Barber-Colman, M. D.

#### Grinders

No. 2AG, No. 3 Dum. Toolpost(10).  
No. 27 Gardner, motor driven.

Disc, Nos. 4 & 6 Gardner, B. B.;  
36" Badger, B. B.

No. 3 Wilmirth & Mormon surface.

No. 2 H. & S. surface; No. 2 Reid.

No. 210 Heald Rot. Surface, 8" chk.

#### Hack Saws

5" x 8" Peerless Univ. Shap., M. D.  
5" x 16" & 9" x 9" Peerless, M. D.

#### Lathes

14" 15", 15" Henvey.  
14" x 6" Lodge & Shipley.  
14" x 6" & 16" x 6" Bradford.  
14" x 6" American, Grd. Hd., M. D.  
14" x 8" & 20" x 8" American.  
20" x 9" & 28" x 11" Hamilton.  
20" x 10" & 24" x 13" Schumacher.  
42" x 16" Schumacher.

#### Milling Machines

Duplex No. 39 Pratt & Whitney.  
Pl. No. 1 Knight; No. 18 Valley City;  
Universal, No. 2 & No. 2A B. & S.;  
Nos. 2 Kempsmith.

Plain; No. 25 Becker; 12" Cincin.  
No. 2B Brown & S., Pl., S. P. D.  
Vertical Nos. 3-H & 4-B Becker.

#### Nibblers

Nos. 1, 1B & 2 Campbell.

#### Planers

42" x 42" x 14" Hamilton.  
30" x 30" x 6" Columbia.  
30" x 30" x 6" D. & H., openside.

#### Presses

Cam Drawing, No. 1 Bliss b. g.

Horn, No. 22 Consolidated.

O.B.I. Nos. 1, 28, 38 & 5A Toledo;

No. 16 Stoll, M. D.; Nos. 4 & 5

Bliss, B. G.; No. 4 Verson, M. D.

#### Toggle, No. 3½" Bliss.

No. 4 & 5½ Waish.  
No. 665 Toledo 800 ton coining.

No. 162 Consolidated double crank.

#### Shapers

16" & 21" Milwaukee, B. G.

18" & 20" G. & E., B. G.

20" Rockford, hi-speed, M. D.

24" Stockbridge, M. D.

#### Shears

No. 316-B Niagara, circle.  
Cleveland Single End Punch.

No. 55 Beloit comb, punch & shear.

#### Screw Machines

No. 2 B. & S., M. D. Hand.

Nos. 0 & 1 Foster, Hand.

No. 2 W. & S., G. F. H., M. D.

No. 2 B. & S., Hand with collets.

#### Welders

Arc: 200 amp. USL; 400 Amp. Linc.

Butt: 15 K. W. Toledo.

Spot: 5 K. W. Dyer; 20 KW Taylor;

12 K. W. A. E. F.

#### Miscellaneous

24" Landis Bolt Cutter.

60" Colburn Boring Mill.

No. 2 Davis Keyseater.

No. 2 Ryerson Friction Saw, M. D.

8" National Automatic Tapper.

**VICTOR MACHINERY CO.**

130-132 South Clinton St.,  
Chicago, Illinois

# HIGH GRADE TOOLS FOR QUICK DELIVERY

## Lathes

14"x5' LeBlond Grd. Hd. S.P.D.  
 14"x6' & 16"x6' LeBlond 3 S.C.D. D.B.G.  
 21"x10' LeBlond, 3 S.C.D. D. B. G.  
 25"x16' LeBlond, 3 S.C.D. D.B.G.  
 14"x6' American Grd. Hd. S.P.D.  
 18"x8' American Grd. Hd. Lathe, S.P.D.  
 20"x8' American, 3 S.C.D. D.B.G.  
 20"x16' American, 3 S.C.D. D.B.G.  
 27"x12' American 8 spd. Grd. Hd.  
 2-18"x8' Lodge & Shipley Grd. Hd. M.D.  
 2-20"x8' Lodge & Shipley Grd. Hd. M.D.  
 30"x20' Amer. 12 speed Grd. Hd. S.P.D.  
 36"x22' Lodge & S. Sel. Hd. S.P.D. Taper.  
 36"x22' Putman Geared Hd. S.P.D. Taper.

## Planers and Shapers

24"x24"x6' Gray Planer.  
 30"x30"x16' Gray Planer.  
 26" Whipp Openside Crank Planer, S.P.D.

## Millers

No. 3 Cincinnati Plain, 3 S.C.D.  
 No. 3 Cincinnati H. P. Univ., 3 S.C.D., D.B.G.  
 No. 4 Cincinnati H. P. Cone 3 S.C.D. D.B.G.  
 No. 4 Cinc. H. P. Cone Univ. 3 S.C.D., D.B.G.  
 No. 2 Cincinnati Plain Cone.  
 No. 2 Kempsmith Cone, M.D.  
 No. 3 Heavy Oesterlein, Cone Universal.

## Grinders

No. 33 Abrasive Surface M.D.  
 No. 2 B & S Surface M.D.  
 No. 1 Diamond Surface Grinder.  
 No. 50, 550, 60, 65, 70 Heald Internal.  
 6"x18" Landis Plain, Self Contained.  
 10"x36" Landis Plain, S.C.  
 12"x36" Landis Plain, S.C.  
 12"x4" Modern Plain, Belt drive.  
 12" Pratt & Whitney Plain Surface Grinder.

## SPECIALS

**72"x48"x14' Gray Planer, two rail heads, one side head. Variable speed self contained countershaft.**

**7" Diameter bar Niles Bement Pond Horizontal Floor type Boring Mill, Motor Driven.**

36" Cinc. Openside Crank Planer, M.D.  
 16, 20, 24" G & E Shapers, cone drive.  
 32" Gould & Eberhardt, H.D., M.D.  
 16, 20, 24 and 28" Gould & E. Shapers, S.P.D.  
 20" Amer. Shaper, M. Mak. Tbl. & vise. S.P.D.  
 16" Ohio Crank Shaper, Cone drive.

## Radial and Drill Presses

21/2" Fosdick Plain S.P.D.  
 3" Fosdick, S.P.D.  
 31/2", 4", 5", 6" Amer. Triple Geared S.P.D.  
 4", 6" American Triple Purpose S.P.D.  
 6" American Trip. Purpose, M.D.  
 4" Dresses Plain Radial, s.p.d.  
 21", 24" Cinc. B. Upright Geared Feeds.

## Gear Cutters

No. 1, 2, 3 Adams Farwell Gear Hobbers.  
 18H Gould & Eberhardt Gear Hobbers.  
 No. 11 B & S spur and bevel Gear Cutter.  
 No. 3-26", 3-36", No. 4-36" B & S Gear Cutters.  
 Gleason Spiral Bevel Generators and finishers.

## Boring Mills

60" Gisholt Vertical Rapid Traverse. S.P.D.  
 7" Niles Bement Pond Horz. Plain M.D.  
 60" Niles Car Wheel Borer.

## Turret Lathes

No. 3 Cincinnati Acme, Arr. M.D.  
 No. 7 Foster Univ.  
 No. 4 & 6 W & S Plain Cone Drive.  
 14"x19" Fay Automatic.

## Miscellaneous

Model W Cleveland Pch. & Shr. 60" thrt., M.D.  
 1" Ryerson Lennox Rotary Bevel Shear M.D.  
 8"x14" Chicago Bending Brake.  
 6"x3/16" Chicago Bending Brake.  
 5"x10 gauge V.K.V. Press Brake.  
 10"x3/16" Shell Power Squaring Shear M.D.  
 6"x6" Peerless Shaping Saw.  
 9"x9" Peerless H./S. Saw.

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CINCINNATI, OHIO

**Due to Manufacturing changes, we offer the following tools, all under belt and ready to run**

No. 6 B. & S. hand screw—both for bar stock and chucking, with counter shaft—2" capacity, \$300.	
Hendey Lincoln Type Miller and c. a.	150.
Landis 6x12 Cylindrical Grinder and c. a.	250.
Cochrane-Bly cold cut-off saw with brand new 22" circular saw.	100.
2 1/4 Gridley Model F—rebuilt by Modern Tool and Die and never run since.	900.
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3 1/2' Morris Radial Drill, Gear Box.  
No. 2 Brown & Sharpe, hand screw machines,  
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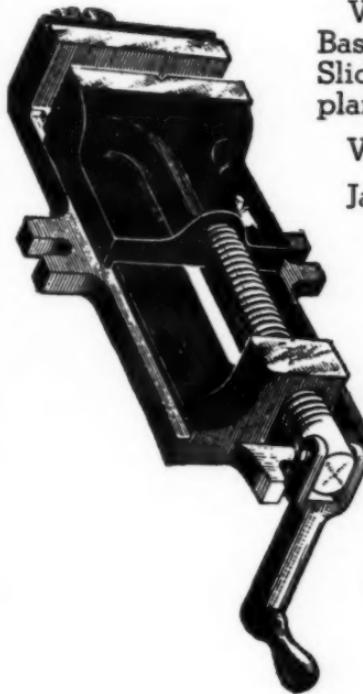
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54"x18" Johnson, m. d., triple geared.  
36"x16" Putnam, b. d., triple grd., q. c.  
28"-35"x12" Boye & E. (raised), b.d., ch.  
28"x12" Boye & Emmes, belt drive, chk.  
20"x8" Amer., 12" spd. grd., hd., reg. eq.  
19"x8" LeBlond, belt drive, reg. equip.  
18"x14" Cinc., b. d., tap. att., chuck.  
17"x6" LeBlond, b. d., reg. equip.

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52" King, vert. 2 hds., rap. trav., q. ch.  
No. 4 Pratt & Whitney Vertical Die Sink. & Milling Mch., table 18"x72".  
2" & 4" Landis Pipe Machines  
14"x36" Pratt & Whitney Surf. Grinder.  
18" Gould & E. Gr. Hob., cap. 30"x12"  
"G" Rock River Punch 24" throat cap.  
3/4"x3/4", motor drive

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24"x 12" South Bend Lathe, with raising blocks.  
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**MOTORS, REBUILT 3 Phase 1/2 to 50 HP various speeds.**

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No. 614 Chicago 6 ft. 14-ga.  
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Nateo Type K 20-spdl.  
Rail. Foote-Burt Nos. 2 & 4, 4 spdl.  
Allen BB 5-spindle.  
Allen BB Type B 8-spdl. spdl.  
Demco DAH BB, MD.  
36" Cincinnati BG PF SL.  
25" Bickford, G. E., American  
BG PF SL.  
20" & 24" Prentice BG.

**GRINDERS:**

Disc, No. 6-20 Besly.  
Disc, No. 220 Badger & press.  
Disc, No. 41; Besly 20".  
Drill, New Yankee, D. E.  
Internal, Madison, Nos. 60 & 65  
Heald.  
Surface, No. 210 Heald 8".

**HAMMERS:**

50-lb. Little Giant MD.  
40-lb. Bradley Helve.

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26" x 12' Putnam Pacific type, DBG,  
Semi-QCC, T. A. 26" Chuck.  
18" x 8 1/2" Rahn & Mayer.  
18" x 8" Lodge & Shipley MD.  
14" x 6" Lodge & Shipley.

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16" Type A Gisholt, 6 1/4" hole.  
21" Type H, Gisholt, 3 3/8" hole.  
24" Type I Gisholt, 4 1/2" hole.  
24" Type I Gisholt, 4 1/2" hole.

**MILLERS:**

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No. 2 LeBlond, plain, M. D.  
Nos. 2 & 3 Kempinski, plain.  
No. 25 Becker-Brainard.  
No. 3B Owen, DH, Vert. att.  
No. 12 Brainard, universal.

**PRESSES:**

Hydraulic, 42-ton Elmes.  
OBI, No. 0, 4 1/2" Loshbough-Jordan.  
Str. Side, No. 7 Z & H, geared.  
Str. Side D-44 Pexto OBI No. 29  
Swaine.

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Queen City DE, 3/4 in 1/2", M. D.  
Rock River L, 1/4 in 1/2", 24 thr.  
Cleveland C, SE, 3/4 in 1/4", 26" thr.  
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No. 14 1/2" W-W.  
No. 54 Beloit S. E.

**SEASERS:**

Jig, GEM, 18 ga. cap., M. D.  
Rotary Bevel, Lennox 3/4".  
Square, Stark 9"; 18 ga. cap.

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Murchey, 3/4" dbl. head, bolt.  
Pipe, 2" Oster M. D.

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ENDER, No. 15 Wallace.  
Dbl. Seamer, Swain.  
Compressor, H-B CCB, 14x928,  
20 HP motor.  
Groover, 30" Toledo.  
Planer, 30" x 30" x 8" Pease and  
Wheeler.  
Metal Band Saw, 14" Racine.  
Saw, cold, No. 2-B Cochran-Bly.  
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PRECISION LATHES, Hjorth 8" x 36" and STARK, complete.  
Cincinnati No. 2M Plain Miller, all geared.

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Bridgeside Lathe 26" x 10"—American Lathe 24" x 12".

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GRIDLEY 2 1/2" Model "G" 4-spindle automatic screw machine.

National Acme 3" Model B 4-spindle automatic screw machine.

Gridley 9/16" Model "G" 4-spindle automatic.

Knight combination vertical milling and drilling machine.

Niles 42" Vertical Boring Mill, 2 heads.

Toledo No. 4 O. B. I. press, motor drive.

American 3" Radial drill — — — Diamond No. 6X Disc Grinder.

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20"x8' Lodge & Shipley.  
18"x12' Hendey.  
16"x10' Sebastian.  
16"x8' Cincinnati.  
14"x6' Monarch.  
13"x5' Willard.

**DRILLS, RADIAL**

4' Western; 4' Mueller.

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No. 1½ Hendey Universal.  
No. 18 Brown & S., Plain.  
No. 2 Brown & Sharpe Plain.  
No. 3 LeBlond Plain.

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6' Oster.  
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16' Steptoe.  
20' Steptoe.  
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No. 4 LeBlond Plain Miller, S. P. D.  
No. 2 Cincinnati plain miller, cone.  
16' Steptoe Shaper, Cone.  
4½' Morris Radial, Gear Box, S. P. D.  
3½' American Radial, Gear Box, Swinging  
and Swivel Table, S. P. D.  
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24"x10' Swings 27½" Greaves-Klusman  
Hvy. Duty Lathe, 20" 4-Jaw Chk., Cone.  
21"x12' LeBlond, Hvy. Duty Lathe, Cone.  
16"x48" Landis Crankshaft Grinders, Self-  
Contained Countershafts, Motor Drive.  
3 Spindle Leland-Gifford Drill, with Grd.  
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35-1/2" to 51/2"	A	28-34,000	Plain
<b>Brown &amp; Sharp</b>			
No. 2, full auto. rebuilt		2875	Plain
No. 19, full auto.		156	2 H.P.
No. 00, full auto.		5349	Plain
No. 00, cut off,		5514	Plain
<b>Gridley</b>			
1-13/4" 4 spdl.	F	6624	10 H.P.
1-21/4" 4 spdl.	F	2500	10 H.P.
1-21/2" 4 spdl.	F	8568	Plain
1-915/16" 4 spdl.	G	10000	5 H.P.
6-7/8" 4 spdl.	G	10000	5 H.P.
2-11/4" 4 spdl.	G	10000	5 H.P.
1-41/4" 1 spdl.		2500	2-5 H.P.
<b>Cone</b>			
6-3/8" 4 spdl.		600 up	5 H.P.
6-11/4" 4 spdl.		600 up	5 H.P.

## HAND SCREW MACHINES

Acme, plain head, 5/8" x 4" Belt Drive.  
B. & S. No. 1 plain head, 5/8" x 3", belt drive.  
Foster No. 3 fric. B. G., P. F. turret.

## DRILLS

Leland Gifford, h. s., b. b., sensitive, 5/8" cap.  
Demco h.s., b.b., 5/8" capacity.  
1, 2, 4, spd. Allen, pwr. fd.; 4 spd. Washburn.  
2 sp. Leland-G. h. s., b. b., sens., 5/8" cap.  
3 spindle. Avey, H. S., B. B., bench type 5/8".  
Drills, 28", 30", 32", sliding head, belt drive.  
Drill, Baker No. 310, h.d., No. 5 M.T., m.d.

## GRINDERS

Gear cutter, No. 23 Brown & S., 8" cap.  
No. 10 Besley disc. 18" dia., discs., b.d.  
Grinder, Landis, 10x20 plain.

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**Over 30 YEARS' EXPERIENCE IN REBUILDING MACHINERY**

## VERTICAL BORING MILLS

36" Bullard New Era, M. D.

42" King.

42" Gisholt.

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No. 21 Lucas, 3" bar.

3/4" Rockford.

3 1/4" D. & H. floor type, arr. m. d.

## MULTIPLE SPINDLE DRILLS

No. C8 Natico, arr. 24 spindles.

No. 11 Natico, arr. 8 spindles.

No. 12 Natico, arr. 20 spindles.

No. 14 Natico, arr. 22 spindles.

## RADIAL DRILLS

Two-3" American, s. p. d.

3 1/4" American, s. p. d.

## GRINDERS

Eight-6" x 32" Landis plain.

10" x 18" Norton type A plain.

10" x 24" Landis plain.

16" x 32" Landis plain.

14" x 36"-42" Norton model 81 type B crank pin.

No. 1 Brown & Sharpe univ.

No. 3 Abrasive surface, arr. m. d.

No. 2 Diamond type B surf., m. d.

6" x 10" x 48" Norton hyd. surf., m. d.

No. 16 Blanchard surface, m. d.

No. 16A Blanch. auto. surf., m. d.

No. 13 B. & S. univ. & tool grind.

Heim centerless, m. d.

## HEADERS

Several No. 0 Wat. F. d.s.s.d. m.d.

No. 1 Wat. F. d. s. a. d. m. d.

No. 3 Manville, d. s. s. d.

No. 3/4 Waterb. F. d. s. d.

## LATHES

12" x 6" Hendey yoke head.

14" x 5" American geared head.

14" x 6" American geared head.

15" x 6" Hendey geared head.

16" x 6" Monarch helical geared.

16" x 10" Hendey geared head.

16" x 10" Prentice, geared head.

30" x 11" American.

27" x 30" x 16" L. & S., sel. grd. hd.

28" x 48" x 16" McCabe dble. spdl.

26" x 48" x 24" McCabe dble. spdl.

## MILLERS

28" Cinc. semi-auto., plain.

28" Cinc. semi-auto., face.

28" Cinc., semi-auto., duplex.

36" Cinc., auto. manufacturing.

16" x 14" Pratt & W. g. h. thread.

6" x 48" Pratt & Whitney thread.

6" x 80" Pratt & Whitney, thread.

No. 1Y Brown & Sharpe plain.

No. 1M Cincinnati plain, m. d.

No. 3B B. & S. heavy duty plain.

No. 13 Brown & Sharpe plain.

No. 33 Brown & S. auto., m. d.

No. 2 Brown & S. vertical, m. d.

No. 6 Becker vertical, m. d.

No. 5 Brown & Sharpe vertical.

No. 2 Brown & Sharpe universal.

No. 2A Brown & S. univ., m. d.

No. 3 Brown & Sharpe Univ.

24" x 24" x 10" Ingerson planer.

## SCREW MACHINES

Nos. 00G, 0G, 00, 2 B. & S. auto.

No. 2 Davenport, 5 spindle, auto.

9/16" Gridley model "G", m. d.

5/8" New Britain auto., m. d.

1" x 5" New Britain Auto., m. d.

1-1/2" x 7" New Britain auto., m. d.

## TURRET LATHES

Nos. 3 and 5 Foster a. g. h.

2 1/4" x 24" Jones & L. steel head.

No. 4 W. & S. all gd. hd. univ.

No. 3A Warner & S.

**J. L. LUCAS & SON, INC.**  
**3 FOX ST. - BRIDGEPORT, CONNECTICUT**

# A STOCK OF OVER 2000

## GRINDERS

16x66 Landis Cylindrical  
No. 12 B. & S. Cylindrical  
No. 72 Cinc. Tool & Cutter  
No. 72 Hard Internal  
No. 4 Gallmeyer & L., M.D.  
6x20" Fitchburg Cyl.  
8x4" Dia. Face, M.D. No. 2 Cinci.  
Centerless.  
B.B. Foundry Grinders, take 22x5"  
wheels.  
No. 2 Brown & Sharpe Surface  
No. 3 Abrasive Sur. 8" Arter Rot.  
Surf.  
No. 16 Blanchard Sur. 36" Mag.  
Ch.  
No. 3 Diamond Sur. 12x48, M.D.

## GROOVERS: Power

8" Stoll; 8" Niagara; 36" and 48"  
Niagara; 48" Stoll

## HAMMERS

100-lb. Mayer Trip; No. 7 Beaupre  
200-lb.  
200-lb. Bradley Cushion Helve.  
No. 2B Nazei  
Stand. Auto. drop, 200; 300; 400  
lbs.

## IRONWORKERS

Univ., 6x6 angles; No. 4 Buffalo

## KEYSEATERS

Nos. 2 & 3 Mitts & M. with cuts.

## LATHES

36x20' New Haven; 30"x16' L.  
& S. Q. T. A.  
9"x31/2"; 16"x8" P. & W., Q. C. G.  
18"x25" Hamilton; 18"x19" L. &  
Shipley, G.H., m.d.  
24"x12" Reed P. Grit. Hd. T.A.  
36"x30' L&K 24" cent., qeg; 48"  
12" Schenck & B.  
24"x8" McCabe Dhl. Spindle  
14"x10"; 16"x10"; 18"x8" Monarch;  
14"x6" Bradford.  
30' Pit Lathe, dia. face plate 156"  
64"x25' Bement Engine  
38"x30' Harrington, \$850.

## LATHES: Spinning

Prybil 22" B. B. (7); 24", 28"

## LATHES: Turret

No. 6 Warner & S. G. H.  
No. 4 & 6 W. & S. cone; No.  
3 Foster  
No. 9 Bardons & O., No. 8 Foster  
Sundst. Stub Lathe, 8" cap., M.D.  
Foster, 1 1/2" cap.; 21" Gisholt

## PLANERS

48"x16" Cleveland openside  
26"x 8" Cleve. Opensid.; 24x8 Cl.  
36x12 Openside Dietrich & H.  
20' Niles Plate Planer

## MILLERS

No. 2R. Kearney & Tr., div. hd.  
No. 21 B. & S. Plain; No. 3 & 4  
Cinc. Vert., M.D.  
48" Cinc. Auto. No. 25 Ohio U.  
No. 2A K. & Tr. V.H.—No. 1A  
No. 2, 3, B. & S. Horiz.  
No. 2, 3, B. & S. Becker Vert.  
Model C Becker Vert.  
No. 2 Pratt & W. Die Sinker

## MILLERS (Cont.)

No. 2 and No. 3 Cin. Cone; No. 3  
B. & S. plain.  
Thread Mill. 6x48, P. & W., m.d.  
36"x16" Ingersoll, planer type  
Ingersoll Planer Type Mil. Mch.  
40 H.P. mtr., tble 48"x22"—4  
Heads

## NIBBLERS & UNISHEARS

No. 1, No. 1B, No. 2 Cambell  
Nibblers, M.D.  
No. A14, A-10, Unishear  
No. 0 Gray Nibbler, 1/8" cap.

## RADIAL DRILLS

2 1/2" Reed P.; 5" Carlton M.D.  
6" Am., 5" Fosd., 6" Western, 6'U.  
3" Heavy type Reed, P.; 2 1/2" Am.  
4" Hammond Jackknife Type, M.D.

## RIVETERS: Stake & Punch

New Dotz, 52" throat; Rock River,  
56" throat  
No. 2A, 3A, 5A & 5 1/2 B High  
Speed Riveting Hammers

## ROLLS: Bending

8 1/4" Beloit; 30"x4" Bertsch, b.d.  
8 1/4" gauge Bertsch, motor drive  
48"x3"; 6" x 3"; 6" Beloit, 7 1/2"  
roll, drop end  
8 1/4" Niles Pyr. drop end.

## ROLLS, Angle Bending, 4x4x 1/2, M.D.

## ROLLER DIE MACHINES

7-Spindle, Adjustable, M.D.

## LEVELLERS: ROLLER

48" 17 rolls, M.D.; 38" Hillies & J.  
50" Leveler, 8 rolls, 4 1/2" dia.

54" McKay 17 Rolls, M.D.

## PUNCHES

No. G 15 Rock River; No. 8  
Whiting, 24" th.

No. 000 H. & J. Dble. End Punch

## SAWS

No. 0, 1 & 2 Ryerson Frie.;  
Hack Saws; 13x16" Peerless; 6x  
6", 9x9" Peerless Shaping.  
30" Atkins Metal Band Saw

No. 8 Marvel

## Hydraulic Scrap Baler 150 lb. bales, Galland & Henning. 56" x 16 1/2" x 24" Chamber.

## SHAPERS AND SLOTTERS

20" Queen City; 16", 24", 28"  
and 32" G. & E.; 20" G. & E.  
m.d.; 20" Ohio; 16" Milwaukee  
24" American SPD thru gear box;  
24" Bement Slotter

## SHEARS: Power and Foot

6 1/2" 8" Chgo. Steel 24" gap  
10" 18 ga. Niag.  
6" 10 ga. Robinson  
Bertsch 10" 3/16"; 10 1/4" g., m.d.  
12 1/2" x 8" United  
10" 3/16" Chgo. Steel, M.D.  
10" 10ga. Robinson  
10" 1 1/2" Niag. 18" Gap.  
10" 3/8" Niag. 18" Gap.  
10" 1/2" United Eng. 5" 1/2" Toledo

## 99% NEW TOOLS

No. 5 B. & S. Surface Grinder, Hydraulic Feed, Ferm.  
Mag. Chuck.  
Lathe, Hardinge, Precision,  
1" cap.

## ANGLE IRON SHEARS

Wright, 6x6x3", double end  
2" H. & J. 6x6x3" on turntable  
Angle & Beam Shear, 8x8x4

## AUTOMATIC SCREW MACHINES

0. 00G B. & S., Ser. No. 8300  
0. 00 B. & S., Ser. No. 9800  
uto. No. 52, 12" Gridley 4 spdl.  
2" Cleveland Model A, sq. pan.  
os. 1, 2 and 3 Manville Auto

## BORING MILLS

2" Niles Cyl. Boring Mach., D. S.  
Niles Vert., 2 heads, M.D.  
Niles-Bement-Pond, S.P.D.  
Gisholt vertical  
2" Rochester 3" Bar  
2" Bullard, 2 heads on rail  
& H. Horiz. Boring Bar, 7"  
quill, 4 1/2" bar

## BRAKES: Hand

Chicago Steel 10'14 ga.; 3x16 ga.;  
4x12 ga.; 4x16 ga.; 6x16 ga.;  
8x18 ga.; 8x16 ga.; 8x14 ga.;  
10x16; 10x18.

## BRAKES: Box & Pan

5", 6" and 8" 14 ga. Ch. St.  
10ga. 4x10 ga. Chgo. steel—Pr.

## BRAKES: POWER

1", 10 1/2", 12 1/2" Chgo. Steel.  
Power Clamping, 8" 10ga.; 8x12 ga.;  
6" 10 ga.; 6x12 ga.; 8x16" 16"

## CAN MACHINERY

201 V & W out. Thread Roller  
lagara, Hubert Type, 26" throat  
cuple Seammers; No. 3 Bliss; No.  
125 Adriance; Toris, Wold for  
oblong cans; Toris, Wold semi-  
auto, cap, 5" dia. 8" high cans;  
No. 1 Holden; No. 108 Cameron  
semi-auto, cap, 10" x 13".  
M.D.; Bliss, for 5 gal. sq. cans.

## DRILL PRESSES

7" Canedy-Otto, vertical, M.D.  
Timken bearing (3).  
eland Gifford, 1 to 4 spdl.

Edlund, P. F. No. 2B Ed-  
lund, 3 sp.

2 Bausch Mnl., 22 sp.  
11 Nato Multi, No. 14 Nato  
Hem High Speed, 1, 2 and 3 sp.  
veland 2 sp. hi-speed  
spindle, Detroit Horiz. Auto.

3 Avey High Spd., B.B., M.D.

## FOLDERS

0x30"-36"42" Bar Folders

## GANG SLITTERS

2" Am. Can (10); 36" L. & N.  
6" Cameron; 48" Bliss

# SELECTED MACHINES

## SHEARS: Power and Foot (Cont.)

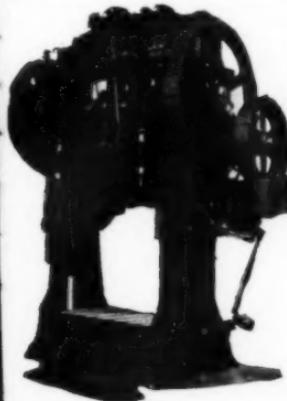
12' 14 ga. Steine; 12' 10 ga. Bertsch.  
6' Thomas Gap Shear, 1" Cap. 24" Gap.  
52" 14 ga.; 72" 14 ga. Pexto.  
42" 18 ga. Niagara.  
No. 11 D & K Milw. Alligator Shear, all steel.  
Rotary Quickwork, No. 10 60" thr. 14 gap.  
Quickwork No. 25, cap. 7/32".  
Throatless 10 ga. 4" & 1/2".  
Foot Shears, 20", 30", 36", 96".  
Circle Shears, No. 19 Niagara, 12 ga.; No. 299 Pexto, 20 ga.; No. 535 Pexto, 16 ga., M.D.

## WELDERS: Spot

5, 7, 10, 25 KW.  
100 KW Federal, Projection Weld. Butt welders, 30 KW; 65 KW; 75 KW.

## WELDERS: Arc

400 amp. Wilson  
300 amp. Halton  
400 and 600 amp. P.H., gas m.d.



400B Bliss, Toggle

## PRESSES: Double Crank

No. 96-G Toledo, 146" betw. upr., 24" str., tie-rod, wt. 162,000 lbs.  
No. 17 Bliss, Gap Fr.; 8" str. 50,000 lbs.  
No. 7-F Bliss, 96" betw. upr., 4" str., 30" x 42" bolster.  
Multiple Gang Punches; No. 6 Nia. 36" bet.; 941G—Toledo, dbl. erk. Tie Rod Fr. 8" str., 161" shut height, 36" x 84" bed, m. d. spring cu.; No. 32 W & W. 8" bet. hon.; No. 30A W & W. 10' bet. hon.; No. 32 W & W. gang 54" bet. hon.  
Ferracute sgl. or dbl. act. toggle 20" str., 271" die space, 43" x 73" bed, m.d.  
No. 138A Stoll, 38" bet. uprights. No. 1D Bliss, dbl. cr., 4" str., 40" between uprights. Back geared

## PRESSES: Horn

No. 25½ Bliss, B.G., swing table.  
No. 14 Toledo; No. 116A Nia.  
No. 21 Bliss; No. 42 Toledo; No. 24 Adriance.  
No. 41A Toledo; No. 12 Nia.; No. 39 Bliss.  
No. 43P Toledo, 18" throat.  
No. 14 Toledo, B.G.; No. 24 Bliss Consolidated, B.G., 6" stroke

## EXCEPTIONAL

### TOOLS

#### GRINDERS

No. 16 Blanchard Surf. Grinder.  
No. 5 Brown & Sharpe Surface Grinder, Hydraulic feed, permanent magnetic chuck, M.D.  
No. 25 Landis Cylindrical Grinder, 24" x 144", self-contained.

## LATHES: Turret

No. 31 Gisholt, hardened ways, m.d.

## LATHES

16" x 8" Pratt & Whitney Geared Head, fully equipped, tool-room machine.  
18" x 10' Lodge & Shipley Geared Head M.D. Tool-room lathe.  
64" x 25' Basement, 36" x 30' Lodge & Shipley, Quick Change Gear.  
40" x 18' Schumacher & Boye 30' Pit Lathe, 156" face plate.  
Sundstrand 8" stub lathe.

## JIG BORER

No. 2 Pratt & Whitney, M.D.

## MILLERS

No. 2B Kearney & T. Univ. Div. Hd. & Vise.  
No. 4 Cinc. Vert. Rapid Tr.

## PRESS BRAKE

10' x 3/16" Chicago Steel

## RADIAL DRILLS

5' Carlton Motor Driven  
6' American; 8' Western

## SHAPERS

32", 28", 24" Gould & Eb. Inv. Gear Box Drive

## PLANER

20' Niles Plate Planer

## ROLLER LEVELLERS

McKay, 17 rolls, 54" wide

## PRESSES Deep Throat

Toledo No. 17, 20" thr.; No. 15

## PRESSES: Straight Side

No. 604 S. Toledo, 1500 t. tier.  
No. 66 Cons. 8" stroke.  
No. 57 Toledo, 8" str.; No. 5 Toledo air cushioned bed.  
No. 6 Walsh, b. g., 3 1/2" str., 1 die space.  
No. 74W Bliss Wedge type.  
All Steel 250 ton, 12" str., Marquette air cushion, bed 5 1/2 x 3 m.d.

## PRESSES: Toggle

No. 31-B Bliss; 3 1/2 & 3 1/4 A No. 40B-B Bliss, 84" bet. up 50 x 84 bed.  
No. 409 Bliss, 108" bet. up pr.

## PRESSES: Coining

No. 664 Toledo, 600 ton, 27K Bliss 1000 ton—2 1/2" 600 ton Waterbury Farrel

## PRESSES: Hydraulic

NBP Gap Frame Woods, 150 ton, 49" bet. hsi. No. 2727 Elms, 325 ton, 40 bet. uprights

200 ton Watson-S., 2—10" rams platen 36" x 10", 38" x 62" bet. columns

350 ton Southwork, 30 dia. ram, 42" x 54" bet. columns 1000 ton Birdsboro, triple ram platens 10" x 12"

## PRESSES: Stiles or Solid Bar

Ferracute, P2, P3, P4, P5, G, No. 4 Bliss, No. 83 Bliss No. 4N, 5N Bliss; 34P Tol. (10

## PRESS BRAKES

Verson All Steel, 60" x 14 ga. 10' 14 ga., 10', 3/16", 10 1/2"

Press Brake, 10' 3/16 D.K. Chgo. Steel. Motor Drive

## PRESSES: OBI

No. 5 Toledo (3); No. 5 Cons. No. 20 Bliss; No. 40 Perkins No. 14 Stoll.  
No. 4 Nia.; No. 3 Toledo; No. Bliss Horizontal, 8" str.  
No. 3 Niagara (5); No. 2 Rock No. 62 Bliss Reducing 8" Stro No. 4 L & J; No. 75B Toledo

## MISCELLANEOUS

Air Comp.: 10x10 Ing. Ran 14x12 Ing. Rand Buffer: No. 3-D Gardner, 5H motor, BB. Column facer, 48" Newton, M. Filing Mch., No. 3 Thiel, M.D. Furnace, Elec., large Pusher ty Gear Hobber No. 18 G. & E. Groovers: 48" Stoll, Pw.; 6" Stoll, 8" Nia.

Davis Gas Acetyl, Gen., 300-lb. (54" Sheeted Paper Cutter, Pow. No. 4 Mott sand blasting unit, No. 4-8 Gaterman Pneu. Tap Oil Separator and Ch. Crush Pipe Threaders, 2" to 10" Tumbling Barrels, 32" x 44" steel.

Wire Straighteners: 3/8" x 8"; 6" Wells 3/8" x 22".  
No. 2X Garrin Tapper

# Guaranteed

## DRILLS

6<sup>1</sup> American Triple Purpose Maxi-Sp. 17<sup>1</sup> Col. Tap. Att. A. C. motor mounted on arm. Extra right angle base.  
 5<sup>1</sup> Dresses Univ. rad. arr. m. d. 3<sup>1</sup> Morris rad. A. C. Mtr. Dr. 4 spindle Avery, B. B. 2 M. T. 4 spindle L-G No. 2 M. T. p. f. 1, 2 & 3 Sp. Allen, P. F. & T. A. 1 & 2 Sp. Demco, H.S.B. T.A. 20<sup>1</sup> Barnes all-grd. self-oiling. 28<sup>1</sup> Cin-Bick. Tap. Att. Gr. Box. No. C-5 Natico, 16 spindles. No. 13 Natico, 16 Spindles. No. 121 Baker, 11<sup>1</sup> Cap. M. D.

## GEAR HOBBERS

No. 1/2 Schuchardt & Schutte. No. 3 Barber Colman, m. d.

## GRINDERS

No. 11 B. & S. Plain, S. P. D. No. 20 Head rotary surface. No. 14 Gardner Opposed Disc. No. 7<sup>1</sup> Gardner, 30<sup>1</sup> Disc, B. B. No. 2 Gardner disc 18<sup>1</sup>, disc pr. No. 2 Brown & S. surface, b. d. No. 1 Wil. & M. B. B. Hand Surf. No. 2 Norton cutter & resamer. No. 1 Cincinnati tool & cutter. 5 H. P., 18<sup>1</sup> Queen City Disc, b. b., New. No. 2 Heim Centerless, M. D.

## LATHES

1<sup>1</sup> & 3<sup>1</sup> Hardge. Bench, Collets. 9<sup>1</sup> x 12<sup>1</sup> Sundstrand Mfg. grd. hd. 14<sup>1</sup> x 6<sup>1</sup> Hendey, Q. C. G. 14<sup>1</sup> x 8<sup>1</sup> Hendey, cks. & collets. 16<sup>1</sup> x 6<sup>1</sup> C. & J. grd. hd., Tinken Bearing, motor in base, new. 16<sup>1</sup> x 6<sup>1</sup> South B., q. c. g. 16<sup>1</sup> x 24<sup>1</sup> x 10<sup>1</sup> S. B. Gsp. 18<sup>1</sup> x 8<sup>1</sup> Barnes. 18<sup>1</sup> x 8<sup>1</sup> B. & E., q. c. g., t. a. 20<sup>1</sup> x 9<sup>1</sup> Hamilton, q. c. g. 20<sup>1</sup> x 13<sup>1</sup> Cisco Grd. Hd., M. D. 24<sup>1</sup> x 12<sup>1</sup> Schum. B. q. c. g. 30<sup>1</sup> x 16<sup>1</sup> H.S. & Gamble, q. c. g.

## LATHES (TURRET)

No. 2A W. & S. univ. 3<sup>1</sup> Hole, single pulley drive. No. 4, W. & S. cone hd., col.

## 54<sup>1</sup> BULLARD NEW ERA TYPE VERTICAL TURRET LATHE WITH SIDE HEAD, A. C. M. D. 4 JAW CHUCK TBL.

## No. 27x30 U BUFFALO UNIVERSAL IRONWORKER, 30<sup>1</sup> THROAT, CAP. 2<sup>1</sup> RD. 1<sup>1</sup> PLATES, A. C. MOTOR DRIVE.

## No. 6 GALLMEYER & LIVINGSTON HYDRAULIC SURFACE GRINDER, 12<sup>1</sup> x 48<sup>1</sup> CAP., A. C. MOTOR DRIVE.

## 72<sup>1</sup> x 54<sup>1</sup> x 24<sup>1</sup> POND DOUBLE HOUSING PLANER, 2 HDS. ON RAIL. TWO SIDE HDS. BELTED MOTOR DRIVE.

## No. 27-K BLISS, 1000 TON KNUCKLE JOINT EMBOSsing & COINING PRESS, 2<sup>1</sup> STROKE, ARR. M. D. LESS MOTOR.

## No. 4, Warner & Swasey 6 spd. Gared Head, M. I. B. No. 5 Foster All Grd. Hd. S. P. D.

## MILLING MACHINES

No. 4 Hendey Norton Pl. S. P. D. No. 3 Kempa, Pl. & Univ. B. G. No. 2 Kempa, Universal, B. G. No. 2 Ohio Heavy Univ. S. P. D. No. 48 Becker, vert. b. b., spdl. 2<sup>1</sup> Rockford universal. No. 3 Rock'd Rigidmill, M. D. No. 6 Whitney hand, motor dr. No. 2Y, B. & S. Pl., mtr. drive. No. 2, Van Norman Sub Head. No. 2, B. & S. Plain cone head. No. 1 Kent Owens B. B. Hand. 4<sup>1</sup> x 12<sup>1</sup> Pratt & W. Thread.

## PRESSES

No. 6-C Bliss Dbl. Crk., Grd. M. D. No. 5 Bliss Con. o b. i.; Grd. No. 4 Rock. & Walsh, o.b.i. Grd. No. 1 Bliss Cam, Fly & Grd. No. 6 Fox "Superflex". Nos. 2 Bliss Cons. o.b.i. Grd. No. 62 Bliss S. S. No. 2R & 3R Rockford, o.b.i. new. Model "B" Rockford o.b.i. Bench. 20 Ton Stecher Screw. 30 Ton Lucas Forging, M. D.

## SCREW MACHINES

No. 00G B. & S. Auto. M. D. No. 0 B & S Hand m. d.

## SHEAPERS

24<sup>1</sup> Stock. & Milw. b. g. crank. 20<sup>1</sup> Hendey B. G. Crk. S. i. D. 20<sup>1</sup> G. & E. & Milw. b. g. crk. 16<sup>1</sup> & 20<sup>1</sup> Step toe b. g. crank. 16<sup>1</sup> G. & E. b. g. crank. 16<sup>1</sup> G. & E. Gear Box, M. D.

## MISCELLANEOUS

Bolt Cut., 2<sup>1</sup> Landis Lead Scr. Bor. Mill, No. 3A Univ. Hor. Borsch, No. 2 LaPointe S. P. D. Borsch, No. 3 Oilgear. Comp. 7x6 Worth Dup., M. D. Disc Filer, No. 5 Rearwin, m. d., New. Disc Filer, No. 5 Thiel, m. d. Keyseater, No. 2 Davis, 3<sup>1</sup> cap. Marking Mch. No. 12 Martin Nibbler, No. 2 Campbell, M. D. Oil Sep. 1 Bu. Curtis, M. D. Planer, 30<sup>1</sup> x 30<sup>1</sup> x 10<sup>1</sup> Am. Box Tbl. Planer, 30<sup>1</sup> x 24<sup>1</sup> x 8<sup>1</sup> Gray. Punch & Shr., No. 55 H. & W. Riv. Ham. No. 2 Grant, 14<sup>1</sup> Cap. Riv. Hmrs. Nos. IAA, 2A, 3A, 3A H. D. & 5A High Speed. Riv. Spin, 3<sup>1</sup> Linley, M. D. Riv. Htr. 1<sup>1</sup> Berwick Elec. 440 v. Saw, No. 2 Klemm Metal Band, M. D.

Saw, 6x6<sup>1</sup> Peer, Univ. shpg. m. d. Scleroscopes, D' Shore. Shtr., 6' x 14' ge. D. & K., sq., m. d. Shear, 10<sup>1</sup> x 12' ge. D. & K. Square, Motor Drive. Shear, No. 138 Marshalltown Rotary, Serpentine, M. D. Slotted, 3<sup>1</sup> Garvin Die. Slotted, 10<sup>1</sup> Sellers. Slotted, 3<sup>1</sup> Rhodes Vertical. Tapper, No. 1 Garvin, m. d. Tester, 3H Rock. Hardness. Threading Mch. 3<sup>1</sup> Geo. M. D. Welder, 10 kva Amer. Elec. Fus. Welder, 12<sup>1</sup> K. W. Fed. Spot. Welder, No. 20A Thomp. Butt

George M. Bernstein & Co.

12 SO. CLINTON STREET

CHICAGO, ILLINOIS

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# Here's Proof That Putnam End Mills Last 64% to 443% Longer



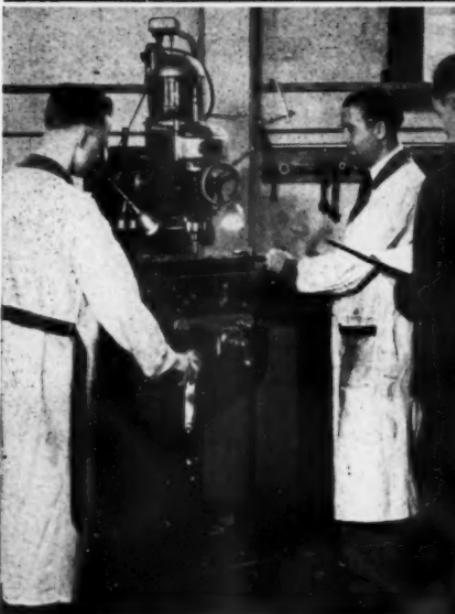
**THE RESULTS**—In the tests, the end mills were identified by numbers only, the company markings having been entirely removed. The actual recorded figures showed End Mill No. 3 to be far superior in long-lived cutting performance. Up to the final disintegration of the flutes, End Mill No. 3

- stood up 64% longer than End Mill No. 2
- stood up 112% longer than End Mill No. 5
- stood up 350% longer than End Mill No. 1
- stood up 443% longer than End Mill No. 4.

After the tests were completed, END MILL No. 3 WAS REVEALED AS A STANDARD PUTNAM HI-SPEED END MILL.

**IMPORTANT NOTE**—These tests were conducted by an organization in no way associated with the Putnam Tool Company. Photostatic copies of the actual report can be supplied upon request.

**THE TEST**—End mills of five well-known standard makes were tested for breakdown in milling slots  $\frac{3}{8}$ " deep in a bar of d steel. Each was a two-fluted cutter of  $\frac{1}{4}$  diameter. The speed—2100 r.p.m.'s or 1 feet per minute. The testing machine—Bridgeport Turret Milling Machine.



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2983 Charlevoix Avenue . . . Detroit, Michigan

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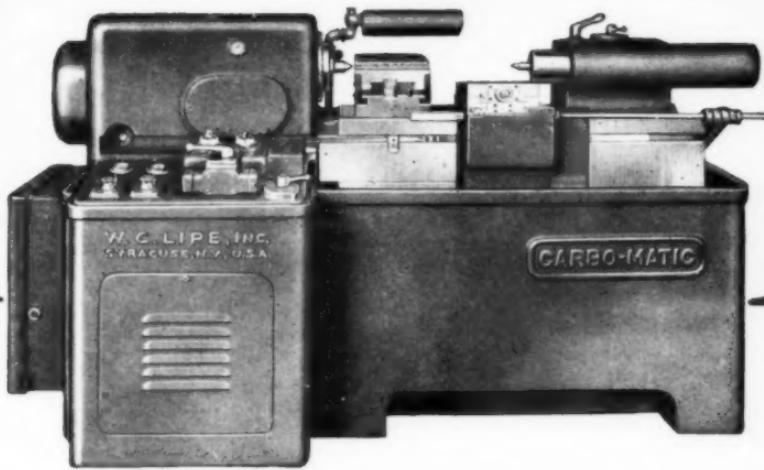
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HEALTH**

sizes: for wheels up to 10", 1½" face, \$125; over 10" and up to 14", 3" face, \$150. Easy to install, easy to clean. Prompt shipment. Write today for bulletin—stating your requirements. Satisfaction guaranteed!

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## The 7 BIG FEATURES You've Been Asking For!

**RIGIDITY** that makes possible turning tolerances commonly used for rough grinding.

**POWER** in a lathe swinging 8" over carriage, 30" between centers, which can use up to 20 H. P.

**FLEXIBILITY** that gives the maximum number of set-up combinations to handle the greatest variety of work.

**SIMPLICITY** so simple, so safe to operate that bigger batteries for one-man supervision become a new efficiency possibility.

**HYDRAULIC CONTROL** from beginning to end . . . from clutch to tailstock, throughout entire cycle.

**SMOOTH CUTS** which only cone worm-gear drive and great rigidity can assure.

**FULLY AUTOMATIC** operating cycle . . . loading and unloading is the only manual operation.

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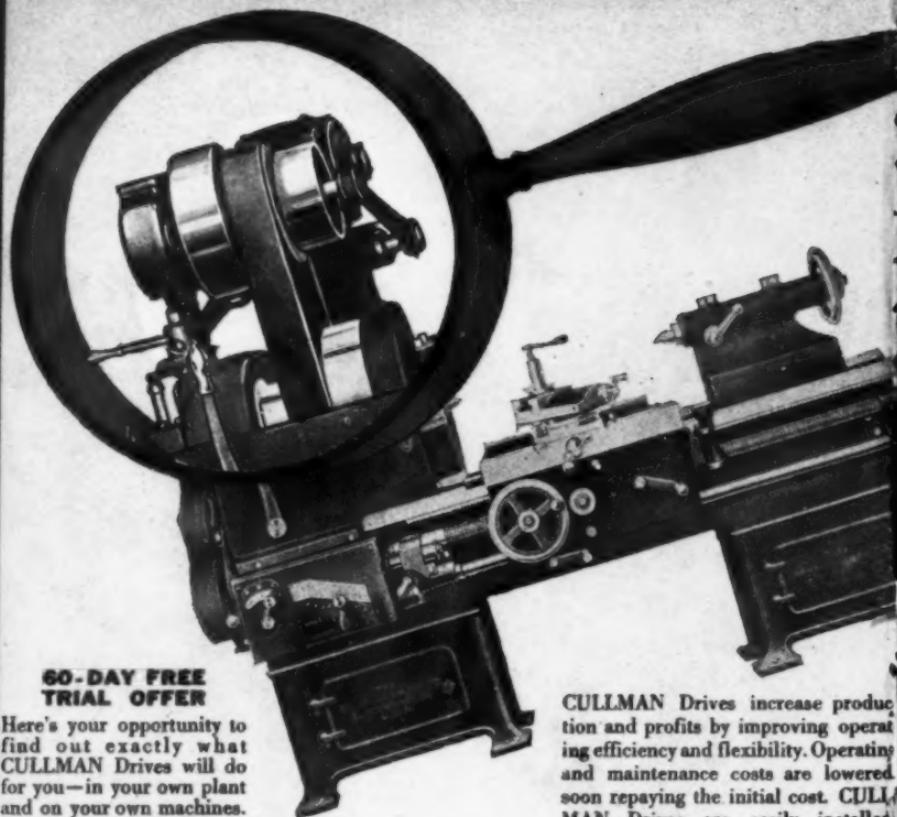
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